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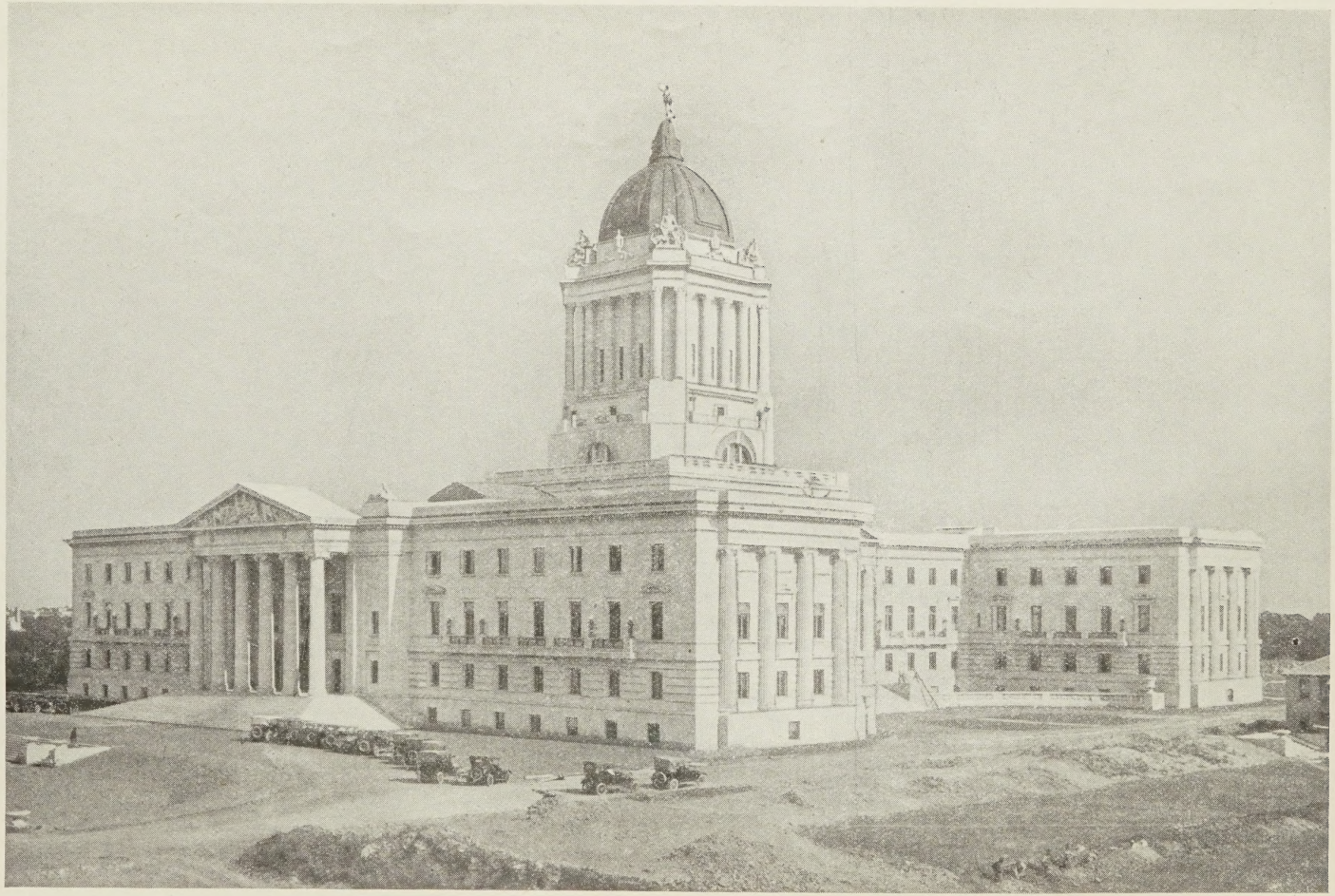

PROVINCIAL PARLIAMENT BUILDING, WINNIPEG

The sculpture work on the building is of more than usual interest and merit.

Canada. National Development Bureau

MANITOBA

Canada

Its Development and Opportunities

By

F. H. KITTO, F.R.G.S.

Prepared under the direction of the Superintendent
Natural Resources Intelligence Service

Department of the Interior
Canada

Hon. Charles Stewart
Minister

W. W. Cory, C.M.G.
Deputy Minister

OTTAWA, 1923

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CONTENTS

CHAPTER		PAGE
I.	PHYSICAL FEATURES Physiography—Geology—Soil—Climate	7
II.	MANITOBA IN HISTORY The Fur Trade—The Red River Settlement—Confederation—Extension of Boundaries	15
III.	PEOPLE Aborigines—Early Settlers—Later Immigration—Present Population	20
IV.	GOVERNMENT Federal Government—Provincial Government—Municipal Self-Government—Judicial System—Citizenship—Militia and Police	25
V.	NATURAL RESOURCES Lands—Forests—Minerals—Water-Powers—Wild Life—Fisheries	31
VI.	AGRICULTURE Evolution of Farming—Grain Growing—Stock Raising—Dairying—Poultry and Bees—Fruits and Vegetables—Manitoba Agricultural College	61
VII.	CITIES AND MUNICIPALITIES Winnipeg—Brandon—Portage la Prairie—St. Boniface—Towns and Villages—Rural Survey System	89
VIII.	INDUSTRIES Manufacturing—The Milling Industry—Meat Packing—Lumbering—Mining—Miscellaneous Industries—Labour	98
IX.	COMMERCE AND FINANCE The Grain Business—Mercantile Business—Banking and Insurance—Mortgages, Loans, Rural Credits and Public Finance	114
X.	PUBLIC UTILITIES Railways—Waterways—Highways—Telephone System—Mail, Telegraph and Wireless Service	130
XI.	EDUCATION AND PUBLIC WELFARE Education—University of Manitoba—Religion—Physical and Social Welfare—Sports and Recreation—Opportunities for the Newcomer	142
XII.	REGULATIONS RESPECTING DEVELOPMENT Sources of Information—Homestead Regulations—Mining Regulations—Timber Regulations—Grazing Regulations—Fishing Regulations—Game Laws—Prairie and Forest Fire Regulations—Customs and Freight Regulations	149
XIII.	BIBLIOGRAPHY	154

ILLUSTRATIONS

Provincial Parliament Buildings, Winnipeg ..... *Frontispiece*
Saskatchewan River above The Pas 8
Map, Vegetation and Physiographic Divisions of Western Canada 9
Interior of Fort Garry 17
Canada Means Much to these New Arrivals 22
Court House at The Pas 27
Flin Flon Mining Centre 39
Hydro-Electric Generating Station, Point du Bois 47
Lynx Falls, Grass River 49
Warren's Landing, Lake Winnipeg 56
Canada's Bread Supply 62
Preparing for the Crop 65
Threshing on Portage Plains 66
Chart, Area under Crop in Manitoba, 1912-1921 71
Harvesting Sunflowers 73
Stockyards at St. Boniface 76
The Standby of the Manitoba Farmer 79
Apple Growing in Manitoba 84
Manitoba Agricultural College 86
Modern Winnipeg 90
Brandon College, Brandon 91
Plan, System of Survey of Dominion Lands 95
Chart, Winnipeg Building Records, 1900-1922 108
Country Elevators at Railway Station 115
Grain Exchange, Winnipeg 120
Chart, Growth of Steam Railways in Manitoba, 1870-1920 130
Map, Railway System of Manitoba 131
Breaking New Roads 135
Permanent Highway Bridge 137
Map, Telephone System of Manitoba 139
Public School, Virden 142
Interior, Provincial Parliament Buildings 146
Chart, Open and Close Game Seasons 152

Manitoba, Canada

Its Development and Opportunities

BY

F. H. Kitto, F.R.G.S.

CHAPTER I

Physical Features

MANITOBA stands out pre-eminently among the provinces of Canada as a field for exploitation. Rich in undeveloped fisheries, in mineral values, and especially in agricultural wealth, it extends not only to the aspiring and intelligent settler the means of useful independence, but to the capitalist an unlimited opportunity for economic gain.

The remarkable growth which has characterized Manitoba during the past half century is indicative of future possibilities. From a small collection of settlers who founded the Selkirk colony on the Red river early in the 19th century, the province has grown until to-day it ranks fourth among the provinces in population and contains the third largest city in Canada. A prairie province of the richest soil, in the very heart of Canada, the gateway through which must pass all trade between east and west, contiguous to the great cities of the Mississippi valley, with an Atlantic shore-line of 400 miles on Hudson bay and within 300 miles of the Great Lakes, the province contains every element of permanent, progressive prosperity. The experimental stage was passed long since and the province is now, economically and industrially, the centre of the Dominion's national life. The same spirit of courage and determination which sustained the original settlers in making their way into the almost inaccessible valley of the Red river and in winning their livelihood in the face of great difficulties, has produced the prosperous Manitoba of to-day.

The difficulties of access which at first retarded the settlement's development were surmounted by the construction of the Canadian Pacific railway augmented by additional railways. The old routes by way of Hudson bay and lake Winnipeg, from lake Superior through the Rainy river and adjoining lakes, and through American territory by way of St. Paul, have long since been discarded and to-day one reaches Winnipeg by rail from Montreal in 48 hours.

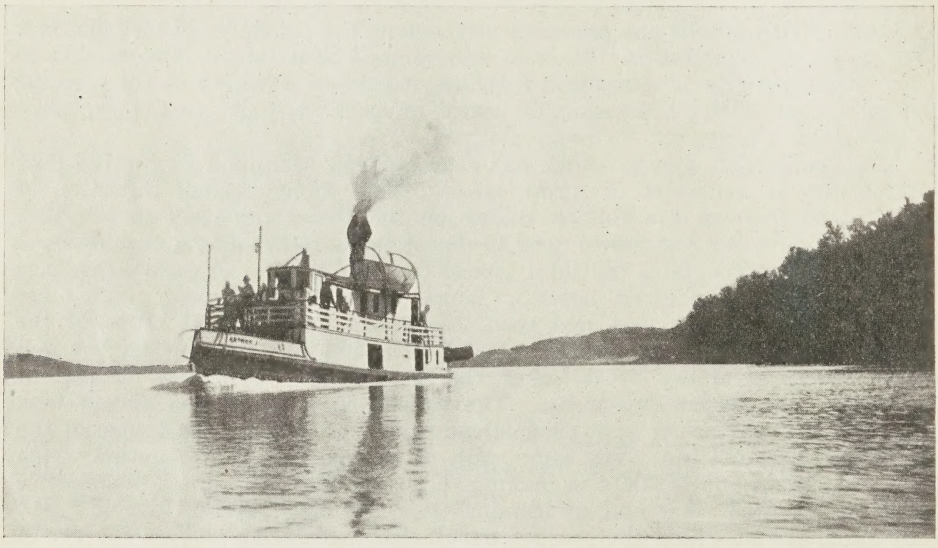
Physiography

Extent and Area.—Considerably enlarged from its original size Manitoba now extends across eleven degrees of latitude, a distance north and south of 761 miles. In the southern portion the distance between the east and west boundaries is 275 miles, while in the northern part the greatest width is 485 miles. The area is 251,832 square miles, of which about 13,500 are covered by lakes.

Elevation and Drainage.—The southern half of Manitoba lies wholly within the great plains region of Canada, and the northern half constitutes a portion of the Laurentian plateau. In no part of the province are there high mountains, though hills and some elevations of 2,600 feet are found in the southwestern part, known as the Porcupine, Duck, Riding, and Turtle mountains. The general elevation of the plains about Winnipeg is 800 feet, descending to sea-level on the shores of Hudson bay.

The province lies within the Hudson Bay watershed and its principal systems of drainage are the Nelson and Churchill rivers. In the south central part there are three large lakes, Winnipeg, Manitoba, and Winnipegosis, having collectively an area of 13,362 square miles. These, with several lesser lakes, are drained by the Nelson river.

One of the chief rivers of southern Manitoba is the Winnipeg, flowing from the western extremity of the Laurentian plateau at the Lake of the Woods into lake Winnipeg, noted for the hydro-electric power generated by its rapid waters. The Red river rising in the state of South Dakota and flowing almost due north,

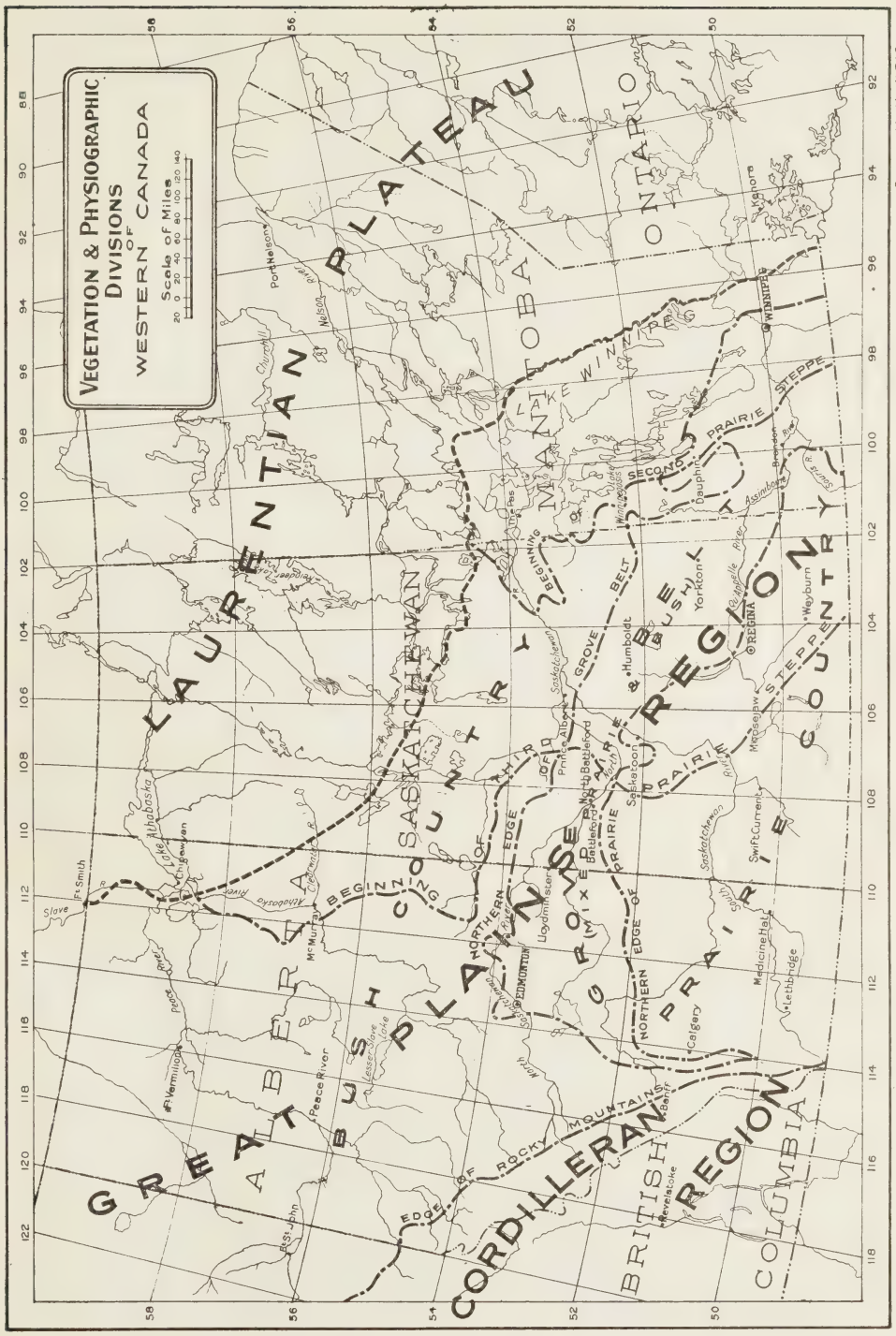


SASKATCHEWAN RIVER ABOVE THE PAS

Steamboat transportation to the northwestern portion of the province follows the Saskatchewan river and chain of lakes.

empties into the extreme south end of lake Winnipeg. It was upon the banks of this river that the Selkirk colony was founded. At its junction with the Assiniboine, flowing from the west, now stands the city of Winnipeg. The chief tributaries of the Assiniboine are the Qu'Appelle and the Souris. These rivers of southern Manitoba, flowing through the almost level plain, have a uniformly sluggish current and are navigable for boats of light draught. At the northern end of lake Winnipeg the Saskatchewan river enters from the west. Draining the central portions of the provinces of Saskatchewan and Alberta, this river with its many tributaries forms a large and important stream.

Northern Manitoba.—The physical characteristics of the northern part of the province are quite distinct from those of the southern half. The Nelson


VEGETATION & PHYSIOGRAPHIC DIVISIONS OF WESTERN CANADA
Scale of Miles
0 20 40 60 80 100 120 140
LAURENTIAN PLATEAU
ONTARIO
MANITOBA
LAKE WINNIPEG
WINNIPEG
GREAT PLAINS
ALBERTA
SASKATCHEWAN
REGINA
EDMONTON
CALGARY
CORDILLERAN REGION
BRITISH COLUMBIA
ROCKY MOUNTAINS
BOREAL FOREST COUNTRY
PARKLAND BELT
SECOND PRAIRIE STEPPE
MIXED GRASS PRAIRIE
NORTHERN PRAIRIE
STEPPE COUNTRY
BEGINNING OF NORTHERN GROWING SEASON
EDGE OF NORTHERN PRAIRIE
EDGE OF ROCKY MOUNTAINS
Prepared in the N.R.I. Service Dept. of the Interior

river, draining lake Winnipeg, flows through a land of hills and valleys, and, cutting its way through a rocky formation, gives rise to many rapids in its course to Hudson bay. North of the Nelson river is found the Churchill whose sources are almost as far west as Alberta and which drains the northern half of Alberta and Saskatchewan, emptying into Hudson bay.

Between the Nelson river and the Ontario boundary line is a tract of rocky country drained by the Hayes river and tributaries. In the far northern part of the province is found the southern terminus of the barren lands, a rough, rocky, uneven country, broken with a maze of ravines, irregular shaped lakes and winding rivers.

Geology

The northern half of Manitoba and that part east of lake Winnipeg lie within the Laurentian plateau, sometimes called the Canadian shield. This plateau is comparatively level and rather low, seldom attaining an altitude of 2,000 feet above sea-level. Its surface is broken by irregular hills, mounds, valleys and ravines. The underlying formation is principally of igneous rocks, granite and gneiss, of great geologic age, weathering and crumbling very slowly. Glacial action has carried away much of the soil leaving large areas of barren rock. The valleys are rich in soil and prolific in vegetation and the greater part of the entire area is wooded.

The southern half of the province forms a part of the Great Plains region. This consists of three steppes or levels, in the lower one of which lies the centre of industrial Manitoba. It is underlain by Palæozoic rocks which are fairly hard. The second rise or steppe is marked by the Manitoba escarpment, of which the underlying rock is Cretaceous of later Mesozoic age. The lower, or Manitoba prairie level, was covered in ages past by a great glacial lake called by geologists lake Agassiz. The deposits gathered on the bottom of this lake now form the amazingly rich soil of the plains.

Geologic change, which is now in process, is seen in the country adjacent to the Saskatchewan river before it reaches lake Winnipeg. In the neighbourhood of The Pas a great fertile plain is being slowly formed. The Saskatchewan river overflowing its banks deposits mud, vegetable matter and other debris in the low places, gradually building up these marshy wastes into fertile plains.

Soil

To the exceeding fertility of its soil Manitoba owes its transition from a fur-trading domain to one of the richest agricultural areas of the world. To the non-scientific the land is known as level, rich, easy to till and free of stones. It does not harden or bake and requires no fertilizer for many years after being broken up.

Soil Areas.—The most uniform area is that of the first prairie steppe, or the Red river valley, in the extreme south of the province. The soil of the second steppe is of a lighter variety but approaches the richness of the lower levels. North of the prairie regions proper, Manitoba possesses large tracts of lightly wooded lands and immense swamp areas which, after being cleared or drained, reveal a soil almost as rich and valuable as the prairie sections. Along the Hudson Bay railway and in The Pas region extensive areas are found suitable, upon improvement, for agriculture. In this section there are large beds of moss or peat which, when reduced by oxidation and mixed with the clay undersoil, form a soil of high fertility. Between lakes Dauphin and

Manitoba the soil, while needing drainage, is very fertile. North of lake Dauphin and along the west shore of lake Winnipegosis the soil is sandy and stony. Between lakes Manitoba and Winnipeg is found a rich black loam interspersed with areas of clay containing many boulders.

On the whole it would appear from the extent of the soil survey so far completed in the districts beyond the well-known prairie portion of the province, which after all represents a small part of Manitoba's land area, that there will be found extensive areas of land suitable for agriculture. Its distribution, however, will not be as regular as on the prairies, and problems of clearing, draining and road building will have to be solved in developing it.

Some have thought that the exceeding fertility of the prairie soil has proved a detriment and that the plains have been overworked, but experience shows that in areas where crop returns have fallen off the fault lies, not in depletion of the soil, but in other causes, such as the unexpected introduction of foreign weed seeds, plants from which have overrun some farms of the old section. With proper utilization and upkeep of the soil, the permanency of Manitoba's agricultural pre-eminence is assured.

Rich in Humus.—The outstanding characteristic of the prairie soils is the large proportion of vegetable matter and its concomitant nitrogen. The large percentage of nitrogen-holding, humus-forming material and its intimate incorporation with the sand and clay gives to these soils their remarkable superiority. This material consists of the remains of countless generations of plant life. Since the glacial period, the prairies have been continuously covered with grasses and leguminous herbage. As layer upon layer of decaying forests are pressed down by succeeding growths to form beds of coal for man's use in future ages, so these growths of grasses and herbs have formed a soil of remarkable depth and wonderful fertility.

Soils of great productiveness are characterized by large percentages of organic matter and nitrogen, while worn-out or partially exhausted soils, resulting from continuous grain growing or other irrational treatment, and soils from naturally poor areas, show meagre amounts of these constituents. As far as soils in humid and semi-humid districts are concerned, there exists a relationship between the organic matter and the nitrogen such that methods of culture which increase the amount of the former raise the percentage of the latter. On the other hand when the organic matter is destroyed, nitrogen is dissipated.

Value of Humus.—In humus is found nature's storehouse for nitrogen that may be readily nitrified and made available for crop use. Upon further decay of the humus valuable percentages of potash, phosphoric acid and lime are liberated so that a large part of the soil food supply of the growing crops is no doubt obtained from the humus. Of equal importance to its chemical value is the influence of humus on the physical condition of the soil. This is most important in increasing the capacity of the soil for holding moisture. Investigations have shown that soils of the same type from adjoining areas, apparently under the same climatic conditions and with equal drainage, will retain moisture in proportion to their organic matter content. The prairie soils, during the growing season, may retain amounts of water far in excess of those present in soils less rich in organic matter, though favoured with a heavier precipitation. Humus also contains properties which favourably modify the tillage methods and temperature of both clays and sands.

The growth of crops depends largely upon the rate of nitrification during their vegetative period, and while temperature and moisture largely control this process, the amount of nitrates formed must be materially affected by the

quantity of the food supply the micro-organisms find in the form of partially decomposed matter. Of all the elements of plant food, nitrogen is the most potent in its influence on crop production. As regards prairie soils, nitrogen may be regarded as the chief index of their fertility or the most reliable measure of their crop-producing power. This applies to both clay and sandy loams. The extraordinary growth that characterizes vegetation on the prairie as soon as the season opens is due, for the most part, to the fact that very rapid nitrification takes place in the spring and early summer months, consequent upon the large water content of the soil and the high temperatures which then prevail.

Other reasons for the remarkable fertility of the soil are the favourable climatic condition of the prairies and their regular physical features. High diurnal temperatures, long days, and a sufficient rainfall during the growing season are conducive to a most luxuriant growth. Rapid nitrification and conversion of inert mineral matter into available plant food take place practically throughout the summer. The winter season, with its dry cold, then practically locks up the stores of plant food from the autumn until the season opens again. Waste from leaching, which occurs where there is an excess of rain to carry off the soluble constituents, or where the winter is mild and open, is thus prevented. The generally level character of the prairies also has precluded those losses of soil by erosion which naturally occur in more or less mountainous districts.

Climate

The climate of Manitoba is one of its most valuable assets and to it is due the extraordinary energy and vitality of the inhabitants and the unexcelled quality of its wheat.

The province lies within the North Temperate zone, between latitudes 49 degrees and 60 degrees north, within which belt are also the British Isles, Holland, mid-Russia, the extreme north of France, and the southern parts of Norway and Sweden. British Columbia and practically all of Vancouver island lie between the same limits. The great disparity of climatic conditions in these lands is due to local influences. Warm ocean currents, proximity to the sea, elevation of the land, the presence of mountains, forests and lakes, all tend to produce climatic variations throughout a girdle of uniform latitude.

As already stated, the elevation of Manitoba varies from sea-level to 1,500 feet above. The province is surrounded by land, except on the northeast, where there is an exposure of 440 miles of shore line on Hudson bay. There are no mountains or oceans in sufficiently close proximity to exert any particular climatic influence.

In general it may be said that the climate of Manitoba is free from great extremes of temperature, or of precipitation. The four seasons are well defined and regular. There is abundance of sunshine and prolonged daylight during the summer months. A comparison of records shows that for an average of seven months of the year Winnipeg has 221 hours of sunshine monthly, while London, England, in practically the same latitude, has only 198 hours. In other words, Winnipeg has 7·4 hours of sunshine daily to London's 6·6.

The following tabular statement discloses interesting facts regarding the possible and actual amounts of sunshine in Winnipeg as compared with other well known Canadian cities:—

SUNSHINE IN CANADA*

Comparison of Yearly and Daily Records, Winnipeg and Other Canadian Cities

City	Yearly Average		Daily Average	
	Possible	Actual	Possible	Actual
	Hours	Hours	Hours	Hours
Winnipeg	4,476	2,177	12·20	5·96
Vancouver	4,375	1,831	12·00	5·02
Toronto	4,459	1,990	12·22	5·45
Fredericton	4,490	2,003	12·30	5·49

*From data taken from the records of the Meteorological Survey of Canada covering a number of years.

Cold But Dry.—Spring comes early and quickly. Long, bright days with an increasing warmth in the sunshine rapidly prepares the earth for seeding. The summers have high day temperatures and cool nights. Sultry and murky days are almost unknown. The autumn is frequently prolonged. Winter as a rule is not severely cold, and the air is dry, clear and crisp. A dry, clear day of 10 to 25 degrees below zero in Manitoba is much more pleasant than a damp and chilly day in many lands where the freezing point has not even been reached. For proof of this statement one has only to observe the men at work in such weather, the children at play or the cattle contentedly feeding about the threshing sites.

Severe in North.—In the northern parts of the province climatic conditions may, in general terms, be said to be less favourable. The more northerly latitude, the extension of the Laurentian plateau with its tendency to more rigorous conditions and the proximity of the great ice floes of Hudson bay all tend to increase the length and severity of the winter season.

Rainfall.—Precipitation is light to moderate but sufficient for the requirements of all classes of grains and vegetables. It occurs mainly in the form of rain during the growing months of June and July when the greatest benefit is derived. Hail storms, which do considerable damage every year to growing crops in Western Canada, are restricted in Manitoba to few in number and the damage done is usually of small extent. The percentage of crop destroyed from this cause during the last ten years has been exceptionally small and it would appear that, with the clearing up and draining of larger areas, the prevalence of hail will grow less. Cyclones and other types of extreme disturbances are unknown.

Snowfall.—The snowfall is very light except in the northern regions and even there it is not excessive. The mean annual precipitation is from 16 to 21 inches, in rain or the equivalent of rain.

Temperature.—Temperatures throughout the province differ but little from the mean at any given time and rise or fall with fairly uniform variations. The hottest day ever reported in Winnipeg was on June 23, 1900, when the temperature reached 100·5 degrees Fahr. The coldest day was December 24, 1870, when 58·5 degrees below zero was registered. On only five occasions in the last 21 years has the temperature gone below 40 degrees below zero. December, January and February are Manitoba's coldest months. March and November are variable. April and October have warm days and cool nights, while May,

June, July and August have a higher average temperature than that prevailing in London, England, during the same period.

The following tabular statement has been compiled from official records of temperature at a number of representative points in Manitoba during a ten-year period:—

AVERAGE TEMPERATURES IN MANITOBA, 1911-20*

Month	The Pas			Winnipeg			Minnedosa		
	Mean	Mean Max.	Mean Min.	Mean	Mean Max.	Mean Min.	Mean	Mean Max.	Mean Min.
Jan.....	− 9·7	− 0·6	−18·7	− 3·3	4·8	−11·3	− 4·6	5·2	−14·3
Feb.....	− 3·1	7·6	−13·8	2·5	12·0	− 7·0	1·8	12·4	− 8·8
March...	11·1	23·4	− 1·2	19·0	29·3	8·8	16·4	27·3	5·4
April....	34·3	45·5	23·1	39·9	50·6	29·2	38·2	50·0	26·3
May.....	47·8	59·0	36·6	52·9	65·8	40·0	45·8	57·7	33·8
June.....	59·7	70·3	49·0	62·5	74·4	50·5	59·8	72·4	47·2
July.....	63·5	73·4	53·6	66·9	78·6	55·3	64·3	77·1	51·5
Aug.....	60·8	70·7	50·9	64·1	75·8	52·4	62·3	75·6	49·0
Sept.....	50·0	60·0	40·0	54·7	65·3	44·0	52·1	64·0	40·1
Oct.....	35·2	42·2	28·1	41·6	51·0	32·2	38·9	49·2	28·6
Nov.....	20·0	27·3	12·7	25·6	33·0	18·5	23·5	32·3	14·8
Dec.....	1·2	8·7	− 6·3	8·0	15·6	0·3	6·3	14·8	− 2·3

*Compiled from records of Meteorological Service of Canada.

CHAPTER II

Manitoba in History

THE history of Manitoba begins in 1610 with the explorations of Henry Hudson, who penetrated through Hudson strait to the southern extremity of James bay. He was cast adrift by his rebellious crew and his fate has never been learned. Sir Thomas Button, being despatched in search of Hudson in 1612, explored the western shores of James bay and entered the Nelson river—the first white man to set foot within the present boundaries of Manitoba. The harbour and river of Churchill was discovered in 1619 by the Danish explorer, Jans Munck. This expedition was followed by the explorations of Captain Foxe and Captain James in 1632. The entire territory of the present Manitoba was included in the grant made by Charles II to the Hudson's Bay Company in 1670.

Among the explorers who penetrated the interior, may be mentioned Hendry, who, in 1754 reached the Saskatchewan river from Fort York at the mouth of the Nelson river; Samuel Hearne, who in 1770 travelled from Fort Churchill to the mouth of the Coppermine river and discovered Great Slave lake; and, especially, La Vérendrye, who with his sons and nephew in 1732 travelled from the west end of lake Superior to lake Winnipeg, thence to the country of the upper Missouri river. His sons later explored as far west as the Rocky mountains. La Vérendrye was the earliest explorer of the plains of Manitoba. He built Fort Rouge at the mouth of the Assiniboine river on the site now occupied by Winnipeg, and Fort la Reine on the site of Portage la Prairie.

The Fur Trade

Trading and exploring were united in the early history of Manitoba. In the majority of cases the fur trader was an explorer, and frequently the explorer was compelled to turn trader in order to finance his schemes. The main route of the Hudson's Bay Company in its operations was by way of the Nelson river, that of the free traders and rival companies was by lake Superior—the Vérendrye route.

Hudson's Bay Company.—Manitoba's fur trade covers a period of 250 years, and may be divided into four terms; first, from the establishing of the Hudson's Bay Company in 1670 to the ceding of Canada to England in 1763; second, from 1763 to the amalgamation of the Hudson's Bay Company with the rival North West Company in 1821; third, to the acquiring of Rupert's Land by the Dominion in 1869; and, fourth, from 1869 to the present time.

The first period saw the company's struggle to establish and maintain a chain of posts on the shores of James and Hudson bays. The difficulties were two-fold: First, was the hazardous undertaking of piloting vessels into these great uncharted and ice strewn seas, establishing posts on their bleak and lonely shores where only yearly calls could be made, and gaining the friendship and confidence of savage tribes speaking strange tongues. Second, was the holding of the trade against the spirited attacks from time to time of a rival nation that sought to extend its colony of New France to the shores of Hudson bay.

The North West Company.—The second period was noted for the rise of a powerful trading company of great strength, the North West Company.

During this period the whole of Manitoba was overrun by fur traders and rival posts were established at every strategic point. The struggle finally led to bloodshed in the regrettable massacre of Seven Oaks in 1816 and the epoch was closed with the amalgamation of contending interests in 1821.

Coming of the Settler.—The third period marks the transition from the predominance of the fur-trade to the pursuits of the agriculturists. With the coming of Selkirk's Red River colonists there began the dawn of a new era on the great plains. Though nominally the rights to this territory and the privileges granted the Hudson's Bay Company in its charter of 1670 were still in force, and continued so till voluntarily surrendered in 1870, it is to the credit of the united fur traders that they realized the inevitable and met it in good spirit.

The last period of the fur trade saw the surrender by the Hudson's Bay Company of its monopoly and lands and the status of the company as a purely commercial concern. To the early fur trade the nation is to-day indebted for the holding of a great territory against the day of settlement, first from French invasion on Hudson bay and later from possible encroachments of the United States in the Red river valley.

The Red River Settlement

The earliest attempt at land settlement and agricultural pursuits on the western plains of Canada was the colonization settlement made by Thomas Douglas, Earl of Selkirk, on the banks of the Red river, in 1812. A tract of Rupert's land covering 116,000 square miles was granted by the Hudson's Bay Company to Selkirk in 1811. This tract, to which he gave the name of Assiniboia, centred at the junction of the Red and Assiniboine rivers, and extended from latitude 52° 30′ north to the height of land separating the waters flowing into Hudson's bay from those of the Missouri and Mississippi. The grant included what is now a portion of Saskatchewan, the whole of southern Manitoba, and parts of the states of North and South Dakota and Minnesota. About half of the area extended into the United States, the boundary of 49° north latitude not having been agreed upon before 1818. The land included in this grant was the richest of the prairie soils.

Pioneer Hardships.—The colonists in 1812 reached their destination by way of Hudson's bay, travelling overland to lake Winnipeg, and were soon followed by other groups of settlers coming from Scotland. Great difficulties were encountered and eventually surmounted by the determined colonists. Inexperience in a new land, severity of climate, lack of proper utensils, and initial food supplies, and soon the pronounced opposition of the fur trading companies, all helped to retard development of the colony. But the patient and courageous struggles of the settlers were in time rewarded with success and the thriving province of Manitoba now crowns their efforts.

In 1834 the Hudson's Bay Company repurchased from the heirs of the Earl of Selkirk all the lands of the original grant, in so far as they lay in Canadian territory, and from that date the settlement became a protégé of the company. The Council of Assiniboia, which had been instituted by the Governor of the colony in 1822, was enlarged in 1835 under the immediate direction of the Governor of the Hudson's Bay Company. Four justices of the peace were appointed, a volunteer corps formed and provision made for the making of laws.

Steady Growth.—Then began an era of slow but steady growth, marked by the usual struggle for industrial establishment and political freedom. Gradu-

ally the opposition of the fur traders to settlement died away, and the ranks of the colonists were increased by retiring traders, French-Canadians, half-breeds and others, who took up land and made their homes at this point. As the settlement increased in numbers and prosperity, the agitation for more suitable form of government grew tense. The desire grew for the status of a Crown colony or for annexation to Canada. In short, the reign of the fur company was being outgrown, and a change was inevitable.

INTERIOR OF FORT GARRY

A vanished scene in the early history of Manitoba. Fort Garry was erected in 1822 and named after Nicholas Garry, deputy governor of the Hudson's Bay Company.

Finally in 1868 steps were taken for the extension of the Dominion of Canada to include Rupert's Land and negotiations began for its purchase from the Hudson's Bay Company. An agreement was reached the following year by which the company surrendered to the Imperial Government their claims to Rupert's Land and the Northwest Territories.

Confederation

The first step towards making the Red River settlement and the great western plains a part of the Dominion of Canada had been accomplished when the Hudson's Bay Company agreed to surrender its claims to these lands. In accordance with the terms of the agreement the company surrendered to the Imperial Government all of Rupert's Land and the Northwest Territory, reserving certain portions in the vicinity of its trading posts, and one-twentieth of each township settled within the fertile belt. This immense tract was then transferred by the Imperial Government to the Dominion of Canada upon payment of £300,000. Titles to lands already conferred by the company were confirmed.

Half-Breed Rebellion.—Unfortunately the matter of transfer was not clearly understood or appreciated by a large part of the population known as half-breeds, living in the Red River valley and the contiguous region, who supposed that the transfer signified the forfeiture of their lands. Under the leadership of Louis Riel these people rebelled in 1870 and set up a Provisional Government. They were, however, speedily subdued by military forces sent from the east.

In 1870 the province of Manitoba was created to include the entire Red River settlement and a lieutenant-governor was appointed to establish a system of provincial government.

Government Organized.—The organization of provincial government was a task requiring infinite patience and studied diplomacy. The scattered community forming the nucleus of the province had heretofore been unaccustomed to even the most elementary forms of responsible government. Moreover, the population was split up into factions widely at variance in racial origin and religious views and with tempers set on edge by recent strife and disorder. The Manitoba Act, creating the province, provided for a lieutenant-governor, who should be appointed by the Federal government, an elective legislative assembly of 24 members and a legislative council or upper house of 7 members. This upper house was abolished in 1876.

One of the first tasks confronting the Dominion Government was the assignment of land to the settlers and its proper delineation on the ground. The terms of settlement with the Hudson's Bay Company provided for the confirmation of titles to all lands granted by it. The Dominion Government further stipulated that a total area of 1,400,000 acres should be set apart for the half-breeds and agreed to recognize settlement made in advance of government surveys. French-Canadian settlers on the Red and Assiniboine rivers had introduced the system of land holdings prevailing in Quebec, resulting in a series of long narrow lots fronting on these rivers and with provision for common pasturage in the rear. A Dominion Land agent was sent to Fort Garry in 1871 and a rush for land was soon under way. Surveyors were put in the field and the block system of township surveys was introduced.

Initial Development.—To the new Provincial Government fell the responsibility of providing roads, bridges and other improvements for the settlers, establishing schools, maintaining law and order and generally carrying out the administration of local affairs. The Dominion at large retained possession of the natural resources in lieu of which the province was allowed a yearly subsidy in cash. Land-seekers began arriving in ever-increasing numbers and when the fertility of the Red River prairies and the possibilities of agriculture were better realized, an era of agricultural development began. As the fur trade waned and the buffalo disappeared before the approach of civilization, the importance of securing produce from the land grew in proportion.

Early Communications.—A stage line between Fort Garry and St. Paul was started in 1871, a telegraph line was built the same year to connect Winnipeg with the United States at Pembina, and in 1872 commercial steamboats on the Red river heralded the disappearance of the cart caravans. Railway service was secured in 1878 when a line was completed from St. Boniface to Emerson, where it met the St. Paul and Pacific. Meanwhile the Canadian Pacific railway was built and the first transcontinental train passed through Winnipeg in 1886. With the building of the Candian Pacific railway, Manitoba witnessed a boom of wildest proportions. It reached its height in the winter of 1881-82 and exploded in the following spring. The abnormal growth of boom days was followed by years of depression since when a steady, healthy growth has prevailed.

Extension of Boundaries

The original boundaries of the province as defined by the Manitoba Act of 1870 were: on the south, the international boundary line; on the north, latitude 50° 30′; on the east, the 96th degree of west longitude; on the west, the 99th degree. These east and west limits were soon extended a few miles further west to coincide with the Dominion system of surveys.

In 1881 the boundaries were further extended, the western line being extended nearly three degrees in longitude, and the northern nearly two-and-a-half in latitude. The eastern line was to be the western boundary of Ontario. This boundary was at the time in dispute, Ontario claiming as far west as the north-west angle of the Lake of the Woods, and the Dominion Government claiming that the boundary was the prolongation of a line due north from the mouth of the Ohio river, which line would cross lake Superior in the longitude of Fort William. The matter was finally settled in 1889, the western boundary claimed by Ontario being accepted. The increase of territory thus gained by Manitoba was nearly 60,000 square miles.

In 1912 the Dominion Government granted a still further extension of boundaries to put Manitoba an an equal basis with the new provinces of Alberta and Saskatchewan. The present boundaries were then defined by Act of Parliament. About 168,000 square miles were added to the province, making a total land and water area of 251,832 square miles.

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CHAPTER III

People

THE territory now occupied by Manitoba was inhabited originally by the following tribes:

(1) In the region of Churchill on the shores of the Hudson bay, a few Eskimo who did not wander inland.

(2) Throughout the remainder of the territory, with the exception of a small area in the southwest, were the Crees, Chippewas, and Maskegons, all members of the Algonquin family.

(3) A limited number of Chipewyans, of the Athapascan family, hunted in that part of the north tributary to the Churchill river.

(4) In the extreme southwest, the Sioux and Assiniboine ranged.

The Algonquin tribes readily make friends with the white man and it is a matter of considerable satisfaction that the passing of Manitoba from the sway of the Indian to the possession of the English was accomplished with a minimum of friction. It is to the credit of the early explorers, traders and colonizers that their humane and diplomatic treatment of the natives made this possible.

Traders in large numbers chose wives from this great family. The offspring of these mixed unions soon became quite numerous and in 1870 their numbers in the newly created province were quoted at nearly ten thousand. In connection with the transfer of lands from the Hudson's Bay Company to Canada, these half-breeds and not the Indians were responsible for the Red River rebellion of 1869.

INDIAN RESERVES.—The following Indian agencies are included in the province of Manitoba: Fisher River, Clandeboye, Norway House, Griswold, Portage la Prairie and Manitowapah, The Pas and Birtle. The reserves in Manitoba suitable for extensive agriculture are mainly within the Birtle, Griswold and Portage la Prairie agencies. Though somewhat adverse to changing their mode of living many Indians have successfully taken up farming. In the northern agencies the occupations are mostly hunting and trapping, though fishing is becoming more popular. The northern Indians are nearly all expert canoe-men and guides, and many find employment with the fur companies, surveyors and travellers. The women are clever with the needle and make fancy-work and baskets for sale.

INDIAN EDUCATION.—Through the Indian agents they are given instruction in farming, stock-raising, lumbering, fishing and other occupations. Industrial, boarding and day schools have been established on various reserves and the education of the children is general. The Indians have adopted the Christian religion and are ministered to through various missions conducted by the Anglican, Roman Catholic, Methodist and Presbyterian churches.

The annual report of the Department of Indian Affairs for the year ending March 31, 1921, gives the total income of the Indians of Manitoba as $765,143, made up as follows: Value of farm products, including hay, $212,338; value of beef sold, also that used as food, $17,715; wages earned, $168,310; received from

land rentals and from timber, $1,026; earned by fishing, $81,175; earned by hunting and trapping, $153,985; earned by other industries and occupations, $61,295; annuities paid and interest on Indian trust funds, $69,299.

The Indians of Manitoba are practically self-supporting and are reasonably law-abiding. They are quite loyal and many voluntarily served in the Canadian forces during the recent war. Their numbers in 1921, according to the Department of Indian Affairs, were 11,583.

Early Settlers.—The fur traders made no attempt to colonize. In the first place permanent settlement was considered detrimental to their interests. The coming of civilization would mean the curtailment of the fur business and it was the desire of the traders to maintain their holdings as vast fur preserves. In the second place, and the traders may be given credit for being perfectly honest in their belief, the country itself was not considered suitable for settlement.

Few white women ventured into the region during the early days, and great numbers of traders married native women. The offspring of these unions are commonly termed Half-breeds, or by the French, Metis.

The Half-Breeds.—The term "half-breed" as applied to these people, is not used in its strict sense but applies generally to persons with sufficient Indian blood to bar them from the white class and enough white blood to distinguish them from Indians. Many have amalgamated with the whites and prominent families who can trace Indian blood in their veins are not rare. Their numbers rapidly increased until they exceeded the combined whites and Indians. They fell into two classes, those of English-speaking descent and those of French, the latter being the more numerous on the Red river.

The Selkirk Settlers.—The Selkirk settlers, arriving in four contingents between 1811 and 1815, numbered about 300, including women and children. They were mostly from the highlands of Scotland, and the north of Ireland. Their numbers were augmented by colonists from Switzerland in 1818, and many French Canadians joined the settlement. After the amalgamation of the rival companies the various classes of people gradually settled down on the Red and Assiniboine rivers in little groups with Fort Garry as centre.

Scottish settlers and the retired traders were gathered on the west bank of Red river at Kildonan; the French, the De Meurons, the Swiss and many half-breeds across the river at St. Boniface; while for a time the main settlement of the half-breeds was at White Horse plains, up the Assiniboine. The total numbers of settlers in 1823 is said to have been about 1,500.

For many years there was little change. Following the flood of 1826 the Swiss moved south to United States territory. The number of retired fur traders was considerably increased and the half-breed population grew apace. The settling of adjacent United States territory and the great buffalo hunts on the Canadian plain attracted numbers to the settlement. The population at the establishing of the province in 1870 has been variously estimated as between 12,000 and 25,000.

Later Immigration

The growth of Manitoba's population during the past half century has been phenomenal. Access to the colony was made easier by steamboat and railway, first by connection with St. Paul in 1878, and then by the opening of the Canadian Pacific railway in 1885. With the setting up of the new province there came a great rush of settlers.

The Dominion census of 1871 credited Manitoba with a population of 25,228. That of 1881 showed 62,260; that of 1891 enumerated 152,506. In 1901 there were 255,211; in 1916, 553,860; and the last census, 1921, shows a population of 610,118.

Many of the early settlers came from Ontario, taking land in the Pembina mountain district.

CANADA MEANS MUCH TO THESE NEW ARRIVALS

All nationalities are building up the Prairie Provinces, becoming prosperous themselves and making the country prosperous.

In 1875 a colony of Mennonites were allotted two reserves where they practised community farming for some fifteen years. In 1876 a party of 250 Icelanders settled on the shores of lake Winnipeg about sixty miles from Winnipeg and established an important fishing industry.

The Canadian Pacific railway opened its lands for settlement at $2.50 per acre and foreign-born immigrants were obtained in large numbers, including Mennonites, Icelanders, Hungarians, Danes, Germans, Moravians and Ruthenians.

The following table shows the number of immigrant arrivals in Canada from 1901 to 1921, classified by countries of origin, the number received by Manitoba and its proportion of the total immigration:—

IMMIGRATION TO CANADA, 1901-1921

Showing Proportion Received by Manitoba

Fiscal Year*	From British Isles	From U.S.A.	From Other Countries	Totals	Number received by Manitoba	Per-centage received by Manitoba
1901	11,810	17,987	19,352	49,149	11,254	22·8
1902	17,259	26,388	23,732	67,379	17,422	25·8
1903	41,792	49,473	37,099	128,364	39,535	30·8
1904	50,374	45,171	34,786	130,331	34,911	26·8
1905	65,359	43,543	37,364	146,266	35,387	24·2
1906	86,796	57,796	44,472	189,064	35,648	18·9
1907†	55,791	34,659	34,217	124,667	20,273	16·3
1908	120,182	58,312	83,975	262,469	39,789	15·2
1909	52,901	59,832	34,175	146,908	19,702	13·4
1910	59,790	103,798	45,206	208,794	21,049	10·1
1911	123,013	121,451	66,620	311,084	34,653	11·1
1912	138,121	133,710	82,406	354,237	43,477	12·3
1913	150,542	139,009	112,881	402,432	43,813	10·9
1914	142,622	107,530	134,726	384,878	41,640	10·8
1915	43,276	59,779	41,734	144,789	13,196	9·1
1916	8,664	36,937	2,936	48,537	3,487	7·2
1917	8,282	61,389	5,703	75,374	5,247	7·2
1918	3,178	71,314	4,582	79,074	6,252	7·9
1919	9,914	40,715	7,073	57,702	4,862	8·4
1920	59,603	49,656	8,077	117,336	11,387	9·7
1921	74,262	48,059	21,156	148,477	12,649	8·5

*From 1901 to 1906 the fiscal year ends June 30th; after 1907 fiscal year ends March 31st.
†Nine months only.

Present Population

The census of the Prairie Provinces for 1916 gives the following information as regards the proportion of population of each specified origin by nativity:—

MANITOBA—ORIGINS OF PEOPLE, 1916

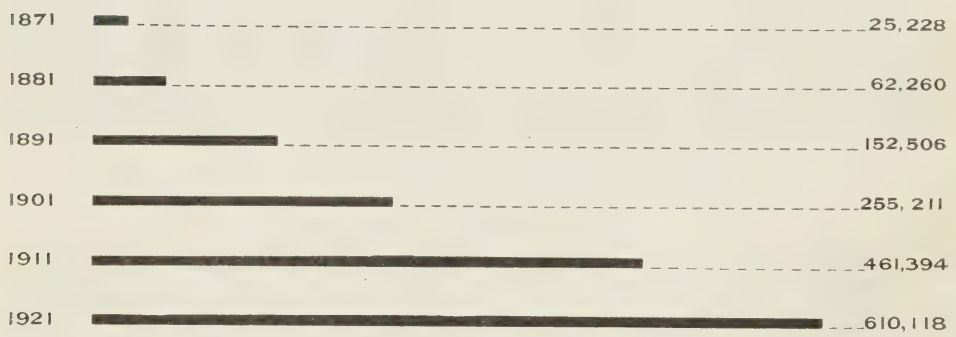
Nativity	Subsection	Per Cent
British Races		57·7
English	Teutonic	28·7
Irish	Keltic	11·6
Scotch	Keltic and Teutonic	16·9
Welsh	Keltic	0·5
French	Italic	6·1
German	Teutonic	4·7
Belgian	Italic and Teutonic	0·8
Austro-Hungary	Teutonic, Slavonic, etc	8·2
Danish	Teutonic	0·3
Dutch	Teutonic	1·3
Icelandic	Teutonic	2·2
Indian	American	2·5
Italian	Italic	0·3
Jewish	Semitic	3·0
Norwegian	Teutonic	0·6
Polish	Slavonic	3·0
Russian	Slavonic	2·9
Swedish	Teutonic	1·4
Ukranian	Slavonic	4·1
Others		0·9

British Predominate.—The British races predominate in the entire province in the ratio of nearly 6 to 4. In Winnipeg they constitute 67 per cent of the population, and in Brandon, 80 per cent. The French predominate in St. Boniface. Together, the British and French races in Manitoba comprise 63·8 per cent of the population. Canada is essentially a country of these two peoples, who accounted in 1911 for 82·6 per cent of its population. Adding to this 63·8 per cent to cover such other peoples as readily assimilate—German, Belgian, Danish, Dutch, Icelandic, Norwegian and Swedish in particular—gives Manitoba a total of 75 per cent of population about which no uneasiness need be felt as regards assimilation, and, as for the remainder, it is evident that no serious obstacle as regards racial origin exists. It is rather a matter of education.

It is not to be expected that much can be accomplished with the older people. They cannot readily break away from fixed habits, traditional customs and hereditary beliefs and adapt themselves to new conditions. But in the rising generation, assimilation must be sought and that through the medium of the school-room. Here the children are taught, not merely the elements of letters, but the real meaning of citizenship. They learn to read and write and speak English, they receive instruction in sanitation, domestic science, agriculture and manual training. But they also learn to love and appreciate the country that is lifting them above the conditions in which their fathers lived, to realize the advantages and responsibilities of citizenship and the privilege that is theirs to be good Canadians.

MANITOBA

Growth of Population



CHAPTER IV

Government

CANADA is a self-governing dominion of the British Empire and consequently enjoys benefits through being an integral part of the world-wide empire, such as national protection, trade advantages and other favours. The constitution leaves her the fullest privilege of domestic self-government.

The Federal Government

The Government of Canada is modelled after that of Britain where nominally the sovereign rules, but in reality the Government of the country is controlled by the elected representatives of the people. Parliament is composed of two houses, the Lords and the Commons, and from these houses an executive council called the cabinet is chosen. The cabinet, which constitutes the real governing body of the country, is responsible to the popularly elected House of Commons and must account to that body for all its acts. The leader of the cabinet, called the prime minister, or premier, is in reality the actual head of the country's affairs, as the sovereign acts only on the advice of his ministers, that is, of the cabinet.

To represent the Crown in Canada, the sovereign, on the advice of his cabinet (who give their advice only after consulting the Dominion Government) appoints a governor general, who resides in the capital city of the Dominion during his term of office. Like the sovereign, he is nominally head of the colonial government, but he, too, acts only on the advice of his ministers.

Parliament consists of two houses, the Senate and the House of Commons. The members of the Senate are chosen for life by the Governor General on the advice of his ministers. The Commons are elected by the people every five years, or at lesser intervals should Parliament for any reason be dissolved within that time. In practice the life of a parliament in Canada rarely extends beyond four years.

Responsible Government.—The leader of the political party having the majority in the House of Commons forms a Government, choosing a number of his parliamentary supporters, as a rule from the Commons, though sometimes a few from the Senate, and these together with himself constitute the Cabinet. He himself heads the Cabinet as Prime Minister, or Premier; the other cabinet members take charge of the various departments of the Government's business and are styled ministers. Subject to the constitution and to the legislation enacted by Parliament, and with full responsibility to the House of Commons for all their acts, they carry on the business of the country. Should the Government or Cabinet lose the confidence of the people's representatives and suffer a defeat in the House of Commons, or lose the confidence of the people and fail to have a majority of supporters elected at a general election, the Governor General receives the resignation of the Prime Minister and his colleagues and calls on the leader of their opponents, called the Leader of the Opposition, to form a new government.

Each province has representation in the House of Commons in proportion to its population; the membership of the Senate, however, is now fixed at 96.

The membership of the two Houses of the Dominion Parliament is now made up as follows:—

PROVINCIAL REPRESENTATION IN DOMINION PARLIAMENT

Province	Commons	Senate
Ontario	82	24
Quebec	65	24
Nova Scotia	16	10
New Brunswick	11	10
Prince Edward Island	4	4
Manitoba	15	6
Saskatchewan	16	6
Alberta	12	6
British Columbia	13	6
Yukon	1	
Total	235	96

Provincial Government

Each province has a Government formed along lines similar to that of the Dominion Government. At the head is a lieutenant-governor appointed by the Dominion Government for a term of five years. His duties in the province correspond to those of the Governor General in the Dominion. Though nominally head of the province's affairs, he acts only on the advice of his ministers. It is his duty, however, to veto any act which in his opinion might be detrimental to the interests of the Dominion at large. In the majority of the provinces there is one legislative body only, elected by the people, and called the legislative assembly.

In each province the lieutenant-governor calls upon the leader of the party having a majority of supporters in the Assembly to form an executive council, the leader being the Premier. This council, subject to certain restrictions and responsibilities, carries on the business of the province. The Legislative Assembly of Manitoba now consists of fifty-five members. The Executive Council consists of the Premier and six other members.

Provincial Jurisdiction.—The Government of each province has control of legislation and matters especially of a more local nature affecting the province, while the Federal Government controls matters of a wider nature, in accordance with the provisions of the British North America Act. The legislature of each province may exclusively make laws relating to education within the province. There are also certain subjects, such as agriculture and immigration, over which both the Dominion and the Provincial Governments have jurisdiction; but, in case the law passed by the province does not agree with that passed by the Dominion, the latter governs. Any law passed by the Provincial Government may be disallowed by the Dominion Government within one year after the receipt of an official copy of the Act. This, however, seldom occurs, except when the Act is one that interferes with the general welfare of Canada or the Empire.

Municipal Self-Government

Following out the basic principle of self-government which characterizes the success of British rule everywhere, the Provincial Government grants to

local bodies of her residents the rights to manage their own affairs as they desire, restricted only in so far as necessary for the well-being of the province at large.

In Manitoba four forms of municipal government are provided for according to the progress and population of the community. Three provide for urban centres and one for rural settlements. The urban municipalities are graded into three classes: cities, towns and villages. They receive incorporation from the Provincial Government and all are under the special care of a municipal commissioner. They elect their own officers, fix their assessment and tax rate,

COURT HOUSE AT THE PAS

This provincial building contains all public offices for the administration of the district.

raise and spend money, make by-laws, and generally look to their own advancement and welfare under several provincial and federal regulations. Manitoba had on February 1, 1921, four incorporated cities, 30 incorporated towns, 21 incorporated villages, and 118 rural municipalities.

Judicial System

The divisions of the judicial system in Manitoba are as follows: (1) the Court of King's Bench, (2) the Court of Appeal, (3) County Courts, (4) Surrogate Courts, and (5) Minor Courts.

King's Bench.—The Court of King's Bench consists of a chief justice styled the "Chief Justice of the Court of King's Bench," and five puisne judges. This court possesses all the powers and authorities of jurisdiction in civil and criminal matters as are vested by the laws of England in a supreme court. Its practice and procedure are practically those prevailing in England at the present day. It also exercises the jurisdiction and powers of the Court of Chancery in England in respect to many matters. Criminal jurisdiction is exercised under the provisions of the Criminal Code of Canada.

Court of Appeal.—The Court of Appeal consists of a chief justice and four puisne judges, who are also *ex officio* judges of the Court of King's Bench. The court as at present constituted has existed since 1906, prior to which date the judges of the Court of King's Bench sitting *en banc* exercised jurisdiction as a Court of Appeal.

County Courts.—County courts are provided in various judicial districts, of which there are at present six, namely, Eastern, Western, Central, Southern, Northern, and Dauphin Judicial Districts. One or more judges may be appointed for each county court or judicial division.

Deputy judges may also be appointed in county courts. Every county court judge is *ex officio* a justice of the peace for the province, and possesses all the powers of two or more justices of the peace. These judges must reside in the county or district in which they preside. Clerks and bailiffs for the county courts are appointed by the Lieutenant-Governor in Council. Matters civil and criminal of certain limitations are dealt with by these courts from which appeals may be carried under prescribed restrictions to the Court of Appeal.

Surrogate Court.—A Surrogate Court is provided in each judicial district of which the senior county court judge is *ex officio* judge. Other offices are the surrogate registrar and the surrogate clerk, respectively. These courts have jurisdiction in all matters relating to the probate of wills and letters of administration and have practically the same powers as the Court of King's Bench sitting as a court of probate.

Minor Courts.—Minor courts include all those of inferior jurisdiction presided over by stipendiary magistrates, police magistrates and justices of the peace. The powers and functions of the presiding officers are similar to those vested in such officers by competent authority in the provinces of Canada.

Judges of the Court of King's Bench, Court of Appeal and County Courts are appointed by the Governor General in Council, and the appointments are for life contingent upon good behaviour. Sheriffs of the various judicial districts, registrars, clerks and official administrators are appointed at pleasure by the Lieutenant-Governor in Council. Stipendiary magistrates, justices of the peace and police magistrates also hold their commissions from the Lieutenant-Governor in Council.

Citizenship

A person must be a British subject in order to hold public office in Canada, whether under Dominion, provincial or municipal governments, or to vote in any election or to obtain a deed for a homestead.

Advantages of Naturalization.—There are many other great advantages in being a "full citizen" of the country of one's adoption, and those who come to Canada from foreign shores with the intention of making it their permanent home will be well advised to take out naturalization papers at the earliest date allowed by law.

The Naturalization Acts of 1914 and 1920 set forth in detail the procedure to be followed by an alien desiring to become a British subject. The authority to issue certificates of naturalization is vested in the Secretary of State of Canada, Ottawa, but proceedings are conducted through the courts. Aliens should make application to the clerk of the nearest Superior, District or County Court of the district in which they live. To be eligible the applicant must show: (*a*) that during the last eight years he has resided for at least five

years in any of His Majesty's dominions, the year immediately preceding the application being spent entirely in Canada, a period of service under the Crown being treated as an equivalent period of residence; (*b*) that he is of good character and has an adequate knowledge of either the English or French language; and, (*c*) that he intends, if his application is granted, to reside in His Majesty's dominions or continue in the service of the Crown.

Certificates of naturalization are, except in special cases, issued only to males of the full age of twenty-one years or over, and to females who are single or widowed and are also of legal age. An alien may, however, on taking out naturalization papers, apply to have included the names of his children who are minors, and living in Canada, and such children shall become British subjects on the issuing of the parent's certificate bearing their names. The national status of a married woman is deemed to be that of her husband, that is, the wife of a British subject, in the eyes of the law, is a British subject and the wife of an alien is an alien.

Women Vote.—Manitoba has universal suffrage and was the first province in Canada to extend the franchise to women. In municipal affairs the right to vote is usually restricted by property qualifications applicable alike to both male and female.

The franchise in provincial elections extends to all British subjects, both male and female (except Indians ordinarily resident on an Indian reservation), who are of the full age of 21 years, provided they have resided in the province during the year, and in the electoral division in which they propose to vote during the three months immediately preceding the election involved and that their names are on the voters' list. Voters' lists are posted in conspicuous places in each polling division prior to an election and an opportunity is given persons entitled to votes, whose names may be omitted, to have theirs added. It is the duty as well as the privilege of every citizen entitled to vote to see that his name is on the voters' list and to exercise the franchise to the best of his ability.

Civil and Religious Liberty.—The unrestricted freedom and privileges given in the ballot are but symbolic of the generous treatment and individual liberty the citizen of a British dominion enjoys. The unexcelled educational advantage, the religious freedom, the opportunity to found a freehold home and establish a means of livelihood are all that it is possible for a paternal country to supply. In the province of Manitoba the homeseeker will find a haven of civil and religious liberty, the opportunity to gain personal success and the right to leave to his descendants and posterity in general a heritage of freedom and prosperity.

Militia and Police

The military, naval and air services of Canada as well as the Royal Canadian Mounted Police are under the control of the Federal Government. Units of the military service, however, both permanent and non-permanent, are located in the several provinces of the Dominion and the naval service on the Atlantic and Pacific seaboards. The air service is but a comparatively new branch of defence and is being organized at Ottawa. Until recently the Royal Canadian Mounted Police were known as the Royal Northwest Mounted Police and their territory was restricted to the western and northern parts of Canada. Now they have jurisdiction in the whole Dominion with headquarters at Ottawa. In addition to representatives of these national forces the province itself maintains a force of provincial police and the various cities and towns have their local police departments. There are also a number of special officers, game guardians and others whose duty it is to uphold law and order.

Military Training.—Under normal conditions military training is not compulsory in Canada. The permanent militia and the naval service offer a field of enlistment for limited numbers of young men who seek careers in the profession of arms, while the non-permanent militia offers an opportunity for short annual periods of training in summer camps. Recruiting for the Royal Canadian, provincial and city police forces offers to limited numbers of men opportunities for such service.

The Militia Act of Canada provides (Section 10) that: "All the male inhabitants of Canada, of the age of eighteen years and upwards, and under sixty, not exempt or disqualified by law, and being British subjects, shall be liable to service in the Militia: Provided that the Governor General may require all the male inhabitants of Canada, capable of bearing arms, to serve in the case of a levee en masse."

Section 69 further enacts that: "The Governor in Council may place the militia, or any part thereof, on active service anywhere in Canada, and also beyond Canada, for the defence thereof, at any time when it appears advisable so to do by reason of emergency."

There are located at Winnipeg and other points in Manitoba a number of military establishments comprising units of both the permanent and non-permanent active militia of Canada. Included are many well-known combatant units as well as complete complements of non-combatant services.

CHAPTER V

Natural Resources

THE natural resources of a state have been defined by Dr. R. C. Wallace, of the University of Manitoba, as "All material whether animate or inanimate, occurring naturally within the geographical boundaries of the state, which contributes, or may be so developed as to contribute, to the well-being of the state as a whole." Broadly speaking, this definition includes the population of the state as well as the inferior forms of life, and the resources of the vegetable and mineral kingdoms. The human race represents the highest resource of any state, for whose benefit all other resources are developed, utilized and conserved. In the following outline of Manitoba's natural resources, however, the human element is not included other than in an incidental manner. The more popular understanding of the term "natural resources" has been adhered to and the human population of the province has been dealt with in separate chapters.

The natural resources of the province may, therefore, with this exception, be first divided into two main sections, the land resources, and the water resources. Of the total area of Manitoba about twenty-three twenty-fifths is land and about two twenty-fifths is covered by water. The land resources may be subdivided into four distinct groups, namely, the land itself, its flora, its fauna, and the minerals, exposed or buried beneath the surface. The water resources constitute two groups, namely, the water itself and the various forms of aquatic life it supports.

Lands

Area.—The land is the greatest natural resource of Manitoba and agriculture the fundamental industry. The total area of the province is 251,832 square miles, of which the land area is 231,926 square miles and that covered by water 19,906 square miles. The total area of Manitoba is more than double that of the British Isles or of the combined areas of Italy and Belgium. It is greater than that of the German Empire, of Spain or of France. The states of Maine, New Hampshire, Vermont, New York, Massachusetts, Rhode Island, Connecticut, New Jersey, Maryland, Virginia, Delaware, Pennsylvania and West Virginia have a combined area that is less than the total area of this Canadian province. The land area alone of Manitoba exceeds the combined areas of North Dakota, South Dakota and Minnesota. Of the nine provinces of Canada, it ranks fifth in extent.

Red River Valley.—The large extent of Manitoba's land area having been noted, the question of its economic value and its adaptability for producing the necessities of life naturally arises. It has been mentioned in preceding sections that the greater part of the province falls within the Laurentian geological division, which is broken and rocky in its general formation and, with climatic conditions none too favourable for vegetable growth, does not offer the best of inducements for agricultural effort. On the other hand, the prairie and lightly wooded portions situated in the southwest part of the province, and constituting the main part of the Manitoba of earlier days before its boundaries were enlarged, have the undisputed reputation of being the best wheat-producing areas of the

world. The renowned Red River valley lands are exceedingly fertile, conditions for intensive production are favourable, and in these and other equally valuable tracts Manitoba possesses extensive land resources of the highest quality.

Agricultural Areas.—The total land area of Manitoba, in round numbers, is 150 million acres. A conservative estimate of the acreage suitable for agricultural purposes is one-fifth, or thirty million acres. This figure includes only lands where the soil, climate, precipitation, drainage facilities and other factors for successful cultivation are known to be favourable, so that under normal conditions satisfactory returns may be expected. If inferior lands, or lands capable of being reclaimed by drainage or other undertakings, were added, this estimate might be materially increased.

Production.—Of the thirty million acres of potential agricultural land less than half is yet occupied and but little over one quarter is improved. Provincial returns for the year 1921 indicate that less than eight million acres were actually under cultivation that year,—in round numbers but one-fourth of the available area. The value of the field crops alone produced in that year are quoted as approximately seventy-two million dollars. Live stock production, dairy and poultry products, fruits and honey would bring the total value of farm products up to a considerably higher figure. With the whole of its arable land under cultivation, and with more intensified methods of cultivation, Manitoba could produce stupendous quantities of food and other supplies.

Broken and Rocky Areas.—Of the remaining four-fifths of the land area there is practically not an acre without some real value. Extensive tracts of rugged and rocky formation, of low irregular hills whose summits and slopes are denuded or partly denuded of soil and whose ranges are interspersed by valleys of swamp and muskeg, not infrequently containing small lakes, though unfit for agricultural purposes, carry a tree growth of considerable value. Even when the forest covering ceases to have a direct worth it has an indirect value in the protection it affords to the many species of valuable wild life prevailing. This territory is by no means waste and it offers great possibilities in the development of commercial forestry and wild life conservation. It is further believed to be rich in minerals.

Swamp Lands.—Manitoba also possesses extensive swamp lands and many projects have been put forth for their reclamation. Once drained they will add materially to the productive area as their fertility is known to be great. In the meantime they produce considerable fur, being favourite haunts of the muskrat particularly, and might be utilized to great advantage in the commercial farming of this rodent, and as shooting preserves. Much of this area has already been set aside as game preserves and the wild life resources of the province are thus being increased. Even the so-called "barren lands" of Northern Canada, which encroach upon the extreme northern part of Manitoba, have been proved to be far from barren. Though void of trees they are covered by a rank growth of moss and other vegetation which supports the countless thousands of caribou that inhabit these regions. The caribou is closely allied to the European reindeer, and its value is important as well as the value of the land that supports it.

From the standpoint of the possibility of making the land produce the necessities of life, there is practically no waste, barren or desert area in Manitoba. On the contrary much of it must be classed with the richest of the world. The application of science to agriculture has made possible the utilization of dormant resources heretofore not recognized. Lands that formerly produced

so-called " big crops " are being made to return bigger and better yields. So-called " worthless lands " are improved and made to produce their quota. Seeds are being propagated that produce variations in plants making their growth more feasible under existing conditions. The range of species as well as the area of their production is being enlarged from year to year. Modern agriculturists, horticulturists and foresters are not content to sit back and let nature take its course, but by the application of increased knowledge stimulate the production of the land.

Room for More People.—The importance of the scientific development of the land resources of a country cannot be over-estimated. The population of Manitoba in 1920 was but three to the square mile, or, if the occupied land only be considered, but thirty to the square mile. In the province of Shantung, China, there are over 3,000 persons to the square mile. Manitoba has slightly over 11,000 square miles of improved farm lands and a population of 600,000. Belgium, with a total area of 11,373 square miles, has a population of seven and a half million. Japan, with a total area of but little greater than Manitoba's, has a population of fifty-three millions. Sweden, with an area of 172,963 square miles, has five and a half million people, while " Northern Manitoba," with similar climatic and soil conditions and an area slightly larger, has but 20,000 inhabitants, including natives. The little European republic of San Marino has but 38 square miles of territory and a population of 11,000. A single township in Manitoba contains 36 sections of one square mile each. Allowing a family of five to every quarter-section, a high average, there would be found but 760 people on 38 sections, the equivalent area of this republic.

The scanty population of Manitoba, the vast areas of virgin land available, and the wonderful productiveness of the soil, are factors that have kept this province free from the problems of existence facing older nations. The teeming millions of China have been compelled by dire necessity to wrest from the land every vestige of sustenance that could be procured. A square mile in Shantung, occupied as has been mentioned by over 3,000 persons, has an average of 256 cows, 256 donkeys and 512 pigs, or a total of 1,024 domestic animals. Taking only the occupied areas of Manitoba, a square mile shows but 20 horses, 40 cattle, 6 sheep and 9 pigs, or a total of only 75 domestic animals.

The Settlers' Opportunity.—When the rapidly increasing population of the world is considered, with its resultant increased demand for food and other essential supplies, the real or potential value of Manitoba's vast land resources and their possibilities will be realized. With congestion in older countries on the increase and natural resources on the decrease, the assets of Manitoba enhance from year to year. The cry for land is heard from every quarter and the uttermost parts of the world are being explored in search of it. Manitoba has still great areas of virgin land awaiting owners. The opportunity to secure free homesteads of 160 acres each cannot last for many years longer, while the price of purchase land is steadily on the increase. In various parts of the globe whole families are coaxing their living from a fraction of an acre of land. Independent possession of land is beyond the reach of the masses in many countries. The opportunity to secure in fee simple an undisputable right and title in perpetuity to liberal holdings in Manitoba is one worthy of the most serious consideration by every person who covets man's most valued privilege—the ownership of his own home.

Some detailed information of the land situation in Manitoba has been condensed in tabular form for ready reference and is shown below. Following sections dealing with other resources will further illustrate the various ways in

which the land is being made to produce, or can be made to produce, the requirements of life. It will be observed that over thirty-five and a half million acres are included in the surveyed belt. It will be of further interest to those seeking free lands to note that on January first of 1922 over five million acres of land were available for homestead entry in Manitoba.

LAND STATISTICS

Areas

	Acres
Total area of province	162,938,720
Total land area	151,751,040
Total area under water	11,187,680
Area within surveyed tract (Jan. 1, 1922)	35,572,128
Area estimated suitable for cultivation	30,000,000
Area under crop, 1921	7,711,313

Disposition of Surveyed Areas*

	Acres
Area under homestead (including military homesteads)	8,367,000
Area under half-breed scrip, sales, special grants, etc	5,094,700
Area granted to railway companies	3,566,997
Area granted to Hudson's Bay Company	1,196,700
Area of School Land Endowment ($\frac{1}{16}$ of area surveyed in sections)	1,630,600
Area under timber licenses†	909,800
Area under grazing leases†	140,600
Area of forest reserves and parks†	2,386,700
Area reserved for forestry purposes (inside surveyed tract)	746,300
Area of road allowances†	974,700
Area of parish and river lots	505,211
Area of Indian reserves	433,860
Area of Indian reserves surrendered	87,560
Area of water-covered lands (inside surveyed tract) †	4,255,500
Area now available for entry	5,275,900
Area within surveyed tract	35,572,128

Forests

Manitoba is usually referred to as a "prairie" province. As a matter of fact over 75 per cent of its land area is wooded. True, the woods are not of the highest value; nevertheless they constitute a resource of no mean degree, which, if scientifically developed and conserved, may in some not-far-distant day cause the adoption of the appellation "forest" as well as "prairie." Gigantic trees such as are found on the Pacific slopes of British Columbia, or beautiful stands of pines and hardwoods such as delighted the eyes of the Ontario lumberman, are not to be found. The white spruce, which is one of the most widely used lumber species of the day, grows to good dimensions over wide areas, and enormous quantities of pulpwood await utilization.

Limited Number of Species.—The forest species of Western Canada, particularly of the Prairie Provinces, are much less numerous than those of Eastern Canada. This applies to both coniferous and decidious varieties, especially the latter. However, in Manitoba some thirty odd species of trees are to be found—a considerably higher number than is generally supposed. Of these only seven or eight species are of sufficient size or number to be of com-

*As at January 1, 1921.
†Area not available for cultivation.

mercial value, and only about four are used for the manufacture of lumber. In fact, aside from the white spruce and jack pine, there is very little lumber material available. Hardwoods are restricted to the southern part of the province and are therefore limited in area.

A list of the principal trees found in the province is shown in the following table:—

TREES FOUND IN MANITOBA

Coniferous		
White spruce	Red pine	Balsam fir
Black spruce	White pine	Cedar
Jack pine	Tamarack	Juniper
Deciduous		
Aspen	Bur oak	Choke cherry
Large-toothed aspen	White elm	Mountain maple
Balsam poplar	Mountain ash	Manitoba maple
Cottonwood	Saskatoon	Basswood
Paper birch	Canada plum	Black ash
Speckled alder	Bird cherry	Red ash
		Green ash

Flora.—The flora of the province is quite varied. In a recent check list of Manitoba flora, O. W. Jackson, Professor of Botany at the Manitoba Agricultural College, reports 1,092 flowering plants, 812 dicotyledons, and 281 monocotyledons. Commenting on his list, Professor Jackson makes the following statements:—

"The most striking feature of our flora is the enormous variety of grasses—104 in all. A feature of the open prairie is the great number of *Compositae*, 126, and Legumes, 46. We have 41 non-flowering plants, 27 of which are ferns, mostly in the Canadian Zone, which comprises all the spruce-pine area in the north-eastern part of the province.

"The Red River valley and the entire northern lake region with an altitude of less than 940 feet is a transitional zone, or mixed prairie. The higher altitudes of the southwest are short grass plains where the *Compositae* and *Leguminosae* perennials predominate."

Forest Areas.—The most valuable forest areas are found on the low-lying lands adjacent to the Winnipeg group of lakes, in the lower Saskatchewan and Carrot river valleys, and in the upper part of the Nelson river drainage basin. Here, great quantities of spruce are found, much of which is of saw-mill dimension, while pulpwood is even more abundant. Much of this area is comparatively easy of access and the proximity of water-power sites adds to its dormant value and makes feasible its economic development.

Some Hardwoods.—In the southern and southwestern parts of Manitoba are found the only hardwoods of commercial importance in the Prairie Provinces. Along the banks of rivers and on the higher ground of the Manitoba escarpment are found limited stands of oak and elm. It has been estimated that possibly two million board feet of each species remains uncut. Efforts are being made to conserve this small supply and many of the best trees are now to be found in parks or forest reserves. Winnipeg, Brandon, Portage la Prairie and many small towns have greatly enhanced the beauty of their residence sections by planting along boulevards and in public squares and parks such stately species of trees as the oak, elm, ash and birch.

Northern Trees.—The principal trees of northern Manitoba include only a few species, namely, spruce (white and black), poplar, tamrack, birch, and jack pine. Of these, the white spruce is the most important species for saw-

mill purposes. It grows to a fair size on high land surrounding the lakes, aver aging from 18 to 24 inches in diameter. Samples up to 36 inches diameter have been found on the shores of Reed lake. It generally grows tall and straight, up to 90 feet in height, and makes excellent lumber, pulp and paper. The black spruce found in low swampy situations is a slower-growing tree and does not usually reach such a size as the white spruce but is valuable for pulp. Jack pine is found on nearly all dry sandy ridges. It is used extensively for ties and where it has attained sufficient size is manufactured into lumber. Tamrack grows extensively throughout the district, and is used for poles, fence posts, ties and fuel. The poplars, aspens or cottonwoods, and the birches have not yet been found of much commercial importance, but are extensively used locally as fuel and to some extent for lumber.

The greater part of northern Manitoba was once covered with a much heavier forest than that at present. This was nearly destroyed by disastrous fires many years ago. The present forests are principally second-growth—following such fire. Many regions, for instance the Burntwood River district, have not reforested. As much of the best timber is scattered in small blocks over wide areas, its economic utilization is thus rendered more difficult.

Forests Products Available.—Though no comprehensive survey of the forest resources of Manitoba has been conducted, the Dominion Forestry Branch has examined a large area of the forest land of the province and from the information secured has estimated that there are upwards of ninety million cords of wood composed of the following species: poplar, 33 per cent; jack pine, 29 per cent; spruce, 28 per cent; white birch, 6 per cent; cedar, 2 per cent; elm, oaks and basswood, 2 per cent.

Of this, approximately 6,500,000,000 board feet are suitable for the manufacture of lumber and seventy-seven million cords for pulpwood, posts, poles, and fuel. The saw material is chiefly spruce, jack pine, and poplar, with small quantities of balsam and larch.

Of the species used for the manufacture of pulpwood, including the saw material, there are estimated to be twenty-four million cords of spruce, twenty-six million cords of jack pine, two million cords of balsam, and thirty million cords of poplar.

Pulpwood Resources.—The pulpwood resources of Manitoba, commercially accessible under present regulations, standards, markets and transportation facilities are estimated at being less than half of the total. As yet the pulp and paper industry of Canada has not been extended to Manitoba but negotiations have been under way for some time for its introduction. The most favourable sites are to be found on the eastern shore of lake Winnipeg, north of the mouth of Winnipeg river, on the Saskatchewan river at Grand Rapids, and on the Nelson between Whitemud falls and Manitou rapids. It is believed that the pulp and paper industry will eventually add materially to Manitoba's industry.

Lumbering.—The lumbering industry of Manitoba plays an important part in the development of the great farming areas whose distance from great forest areas gives to the local product an enhanced value. Statistics report that in 1920 there were in operation 56 plants representing a combined capital investment of $3,804,564. The saw-mill output for that year was valued at $2,058,590. Adding to this the value of non-saw material, the total forest products would easily exceed $2,500,000 in value.

Forest Reserves.—Certain areas of wooded lands have been reserved from settlement and set apart by the Dominion Government for forestry purposes

under the management of the Forestry Branch of the Department of the Interior. In Manitoba they comprise an area of nearly four thousand square miles and lie chiefly along the Manitoba escarpment. The importance of conserving the woods of the province cannot be over-estimated when it is realized that not only in the prairie regions of Canada but throughout the whole Dominion and the continent of North America, the shortage of forest supplies is becoming acute. By making lands of inferior value for agricultural purposes produce their quota of wood supply, however meagre, a decided gain has been effected, while in the control of systematic cutting in the reserves and the protection from fire afforded by the regular patrols, the supply can be maintained in perpetuity.

The Dominion forest reserves, with their areas in square miles, are shown in the following statement:—

FOREST RESERVES IN MANITOBA

Reserve	Area in square miles
Turtle Mountain	109·25
Spruce Woods	224·25
Riding Mountain	1,158·43
Duck Mountain No. 1	1,462·25
Porcupine No. 1	775·00
Total	3,729·18

Trees and Climate.—Further, there must be taken into consideration the beneficial effects of forests on climatic conditions, water supply and the protection of game. Everyone knows the value of a windbreak of trees sheltering the home. To the scattered bluffs of small woods intervening between the open prairies and the heavier wooded districts is due the remarkable degree of success which has accompanied the efforts of the "mixed" farmer. The shelter that stock enjoy from these occasional woods is incalculable, and the aesthetic effect also is not to be overlooked. Any farmer who realizes this value will readily relinquish a few acres to be set apart as a shelter belt. The time is coming when the whole aspect of the prairies will be changed by the process of tree planting.

Shelter belts protect not only the buildings and stock but also the growing crops. Observations made by the superintendent of the Tree Planting Division at Indian Head have led to the conclusion that the protective influence of a belt of trees on the adjacent growing crops amounts to about 50 feet in width for every foot in height of the trees. That is a row of trees 15 feet high will give a valuable shelter for 750 feet out into the adjoining grain fields. Farmers whose fields contain various clumps of trees recognize their value as winter shelter and in threshing the grain arrange to have the straw piles placed on the south sides of such clumps. Here during the coldest days of winter the cattle may be found contentedly feeding.

Advantages of Tree Planting.—In the matter of supplying wood for fuel these plantations can be made quite profitable. The coarser varieties, such as Russian poplar, grow very rapidly and six years after setting out an acre of young shoots a summer's supply of stove wood can be cut. Other varieties will

provide fence posts and poles, which are always in demand on a farm, but will require longer to develop. However, it is possible, in the majority of cases, by planting two or three acres of a mixture of varieties of western trees to secure in ten or fifteen years a permanent source of supply of firewood, poles, and posts sufficient to meet the ordinary requirements of the farm from year to year. The initial expense is small though considerable work is entailed, but the time saved when returns come in more than repays the trouble.

Railway companies have found that the planting of shrubs as windbreaks along their right of way to stop the snow from drifting over the tracks has proved a success. Rural municipalities will find that beneficial results can be obtained by protecting roads in the same manner, also in retaining embankments and in beautifying the landscape.

It is to be hoped that the practice of planting will extend to every rural home and municipality. Odd corners in fields, broken lands in ravines, scrubby or other worthless areas can be turned into valuable parts of the farm if trees can be induced to cover them. Experiments made in various sections throughout the whole province have met with almost unqualified success. With proper preparation of the soil and a little care during the first two or three years, trees can be grown successfully in any part of the province.

Government Assistance.—The Forestry Branch maintain a tree planting division at Indian Head, Saskatchewan, under the charge of a resident superintendent. The efforts of this division were at first principally confined to the planting of windbreaks and wood lots with considerable success. Experimental plots are being planted in various parts of the prairie provinces. On the Pines reserve near Prince Albert, which is almost pure sand, white spruce seedlings have been tried, as well as jack pine and lodgepole pine, and all have been found to do well. It thus appears possible to produce the valuable white spruce as well as the coarser trees on this class of land. The province has a wide opportunity to increase its forest wealth. Trees are distributed free by the tree-planting division to any farmer who wishes to plant a shelter belt.

The administration of the affairs of the Forestry Branch in Manitoba is in charge of a local district inspector with headquarters at Winnipeg. His officers include four forest supervisors and three chief fire rangers. Good work is being done in protecting the forest from fires, the patrols of the fire rangers taking them throughout the wilds of all the wooded areas. The care now exercised by the Indian tribes who inhabit these regions, and the few whites who travel in them, in the extinguishing of their camp fires is a marked tribute to the thoroughness of this work. The enforcing of proper cutting and brush-burning methods by lumbermen is also having its effect. The primary function of these reserves at the present time is to supply wood to local settlers. Nearly all the reserves are wholly or in part game sanctuaries. Outside the reserves the forest lands are administered by the Timber and Grazing Branch of the Department of the Interior.

Forestry Possibilities.—The value of the forest resources of Manitoba should not be reckoned as they exist to-day but rather on the basis of their possible development. Unlike a mineral resource, which, when mined, is gone forever, forests can be grown as a continuous crop. By a far-seeing and scientific commercial forestry policy the non-agricultural areas of Manitoba may be developed into areas of great productiveness and much revenue. In an address before the Canadian Forestry Association at Winnipeg in 1913, R. H. Campbell, Director of Forestry, suggested the possibilities of work along this line in northern Manitoba by making timely comparisons with Sweden.

Comparison with Sweden.—Sweden is a northern country having similar conditions of climate and soil, much of it being underlain by a granite formation like that of the Laurentian area. It is about equal in extent to northern Manitoba, its total area being 172,963 square miles as compared with northern Manitoba's area of 178,100 square miles. By following a systematic forestry policy during recent years, Sweden has placed the industry on a profitable basis, and is now receiving a national revenue and giving employment to thousands of her people, at the same time providing for replenishing the forest supply in proportion to the consumption. In 1905 her wood-working industries included 1,370 saw-mills, 138 pulp-mills and 20 match factories, giving employment to 56,424 people. The government forests gave employment to a staff of 971 rangers and officials, and yet yielded a net revenue of $2,122,625. The total values of her forest products for the year were $107,000,000. Comparison of this with northern Manitoba's products valued at less than one million but with natural conditions as favourable, cannot but suggest the great opportunities that await the province in commercial forestry.

Minerals

As the forest possibilities of Manitoba, are apt to be minimized through the attention of the general public being monopolized by agriculture, so the aspiration for mining honours, which every country entertains, has been stifled by a general lack of knowlege of mineral potentialities. Judging from recent discoveries, however, it would appear reasonable to predict that Manitoba will assume in a few years, the role of a mining province.

Recent Discoveries.—Until recent years Manitoba's mineral production was restricted to structural materials and clay products, consisting principally of building stone, gypsum, brick and other clay products and cement. The

FLIN FLON MINING CENTRE

Development camp in the prospective copper producing area of Manitoba.

discoverey of the famous Flin Flon twenty-million ton copper ore body, the wonderfully rich Mandy copper claim adjoining and numerous gold quartz veins in the same district, which is north of The Pas, together with simultaneous

discoveries of gold-bearing quartz east of lake Winnipeg, set the mining world agog with interest and awoke the province to a realization of the wealth that might accrue from the development of these heretofore unknown resources. An era of scientific examination, study and search has set in and scarcely a month passes without new finds or indications being reported.

Mineral Production.—The following table contains a list of all the minerals of Canada recently produced in commercial quantities. Those found in Manitoba are indicated by an asterisk. In cases where they have been commercially produced a double asterisk is used.

I. Metallic Ores

Aluminium
Antimony*
Cobalt*
Copper**
Gold**
Iron*
Lead*
Mercury
Molybdenum*
Nickel*
Platinum and palladium*
Silver**
Tin*
Tungsten*
Zinc*

II. Non-metallic Products

Abrasive materials:
  Corundum
  Grindstone
  Tripolite
Actinolite
Alunite and pyrophyllite
Arsenic
Asbestos
Barytes
Chromite
Coal*
Coke
Feldspar
Fluorspar
Graphite
Gypsum**
Magnesite
Manganese
Mica*
Mineral pigments:
  Ochres*
Mineral water
Natural gas*
Peat*
Petroleum
Phosphate
Pyrites*
Quartz*
Salt**
Talc*

III. Structural Materials and Clay Products

Cement**
Clay products:**
  Bricks**
  Fireclay**
  Pottery
  Sewerpipe**
  Tile**
Lime**
Sand-lime brick**
Sand and gravel**
Slate*
Stone**

Values.—The total value of mineral production in Canada in 1890 was less than seventeen million dollars. In 1900 it had increased to nearly sixty-five millions; in 1910, to about one hundred and seven millions, and in 1920 it exceeded two hundred and seventeen million dollars. In a period of thirty years the yearly production showed, therefore, a gain of over two hundred million dollars, and in the last ten-year period a gain of one hundred millions. The part played by Manitoba in this has as yet been small, but the industry has scarcely made a beginning and if it can obtain a successful foothold it may expect to share in this phenomenal growth. Its growth, as compared with the

whole of Canada's, for the ten-year period from 1911 to 1920 is shown on the following table:—

MINERAL PRODUCTION OF CANADA AND OF MANITOBA, 1911-1920*

Year	Manitoba	Per Cent	Canada
1911	$1,791,772	1·74	$103,220,994
1912	2,463,074	1·83	135,048,296
1913	2,214,486	1·52	145,634,812
1914	2,413,489	1·87	128,863,075
1915	1,318,387	0·96	137,109,171
1916	1,823,576	1·03	177,201,534
1917	2,628,264	1·39	189,646,821
1918	3,220,424	1·524	211,301,897
1919	2,868,378	1·62	176,686,390
1920	4,223,461	1·854	227,859,665
Total	24,965,311	1·520	1,632,572,655

* From data furnished by the Mines Branch, Department of Mines, Ottawa.

The values and quantities of the various minerals and mineral products produced in Manitoba during the four-year period from 1917 to 1920 are shown in the following table:—

MINERAL PRODUCTION OF MANITOBA, 1917-1920*

I. Values

Product	1917	1918	1919	1920
	$	$	$	$
Copper	303,329	576,234	625,775	534,604
Gold	9,095	139,638	14,966	16,145
Silver	5,863	12,886	23,069	15,649
Tungsten concentrates	.....	42	.....	.....
Calcined gypsum	258,934	341,352	371,337	487,894
Natural gas	.....	.....	.....	60
Clay products	114,651	116,417	131,737	206,764
Lime	92,932	134,725	147,131	210,984
Cement	1,175,669	1,283,948	.....	.....
Sand-lime brick	76,742	82,438	124,847	197,734
Stone	301,968	238,251	89,067	374,286
Other products	289,081	294,493	1,340,449	2,179,341
Total	2,628,264	3,220,424	2,868,378	4,223,461

II. Quantities

		1917	1918	1919	1920
Copper	Lbs.	1,116,000	2,339,751	3,348,000	3,062,577
Gold	Ozs.	440	6,755	724	781
Silver	"	7,201	13,316	20,760	15,510
Tungsten concentrates	Lbs.	.....	177	.....	.....
Calcined gypsum	Ton	33,347	37,483	32,903	44,371
Natural gas	M cu.ft.	.....	.....	.....	200
Lime	Bush.	393,982	462,544	476,452	605,399
Cement	Bls.	544,949	500,302	.....	.....
Sand-lime brick	No.	5,070,500	5,395,423	7,389,300	10,278,802

Salt Industry the First.—The first product of a mineral nature commercially utilized in Manitoba was salt. Brine springs are found at various places and salt evaporated from some of these was used locally and sold by the Hudson's Bay Company about 100 years ago. The salt industry, however, did not pass beyond the local stage. The production of gypsum, cement and building stone, and the manufacture of clay products represented Manitoba's commercial utilization of mineral resources prior to the year 1917. The most widely known of these products is the beautiful mottled Trenton limestone, commonly known as Tyndall stone, which is quarried at Tyndall and Gascon, 29 miles east of Winnipeg.

Prominent Mining Districts.—Geologists, prospectors and others had for many years reported actual discoveries or promising indications of metallic ores, and as early as 1912 many claims had been staked in various outlying sections. Actual production was commenced in 1917 when the Mandy copper mine of northern Manitoba shipped quantities of high-grade copper sulphide ores to the smelter at Trail, British Columbia. The success of this effort stimulated the search for more minerals and three promising districts are now receiving considerable attention from mining men. These are: (1) the Northern Manitoba district, north of the Saskatchewan river, (2) the Rice Lake district, between lake Winnipeg and the Ontario boundary; and (3) the Boundary district, in the southeast part of the province.

Northern Manitoba District.—The Northern Manitoba district, sometimes called The Pas district, commences on the Manitoba-Saskatchewan boundary about midway between the Saskatchewan and Churchill rivers, and runs easterly for some 100 or 125 miles, with a general breadth of 15 to 25 miles. Original discoveries of gold-bearing quartz were made about 1912 on Amisk (or Beaver) lake, which lies just within the Saskatchewan side of the boundary line. Prince Albert interests began prospecting and for a time the territory was known as the Beaver Lake district. Discoveries of copper sulphides were soon made on the Manitoba side of the line of which the most notable are the Flin Flon group of claims and the Mandy. The former are on a small lake known as Flin Flon which is divided by the provincial boundary line. The latter is on Schist lake, about four miles distant. Owing to the magnitude of undertakings necessary for the working of the Flin Flon claims only preliminary steps have as yet been accomplished. The Mandy, however, performed the remarkable feat of mining and shipping by teams, river steamboats and rail, some 26,000 tons of high-grade ore many hundreds of miles to a smelter in British Columbia.

In an easterly direction from Amisk lake are numerous lakes which form a natural highway of travel by canoe across this district. The principal and best known in Manitoba are Flin Flon, Schist, Athapapuskow, Copper, Cranberry lakes (three in number), Elbow Island, Reed, Sandy and Wekusko (or Herb). Still farther east the Grass river may be followed to Split lake and Nelson river.

Headquarters for this district are at The Pas on the Saskatchewan river. The westerly end of the area is reached by steamers which ply on the Saskatchewan river and Cumberland and Namew lakes from The Pas to Sturgeon Landing. From the Landing, Athapapuskow lake is reached by a 17-mile wagon road, or by a canoe route through Goose lake. All parts of the district are from there accessible by canoe in summer time or dog-team in winter. From the south of Wekusko lake, at the easterly end of the district, an 11-mile wagon road connects with Mile 82 on the Hudson Bay railway.

Following the copper discoveries on Flin Flon and Schist lakes, came reports of findings of gold-bearing quartz on Wekusko lake. Many claims were staked and considerable development work accomplished. A stamp mill was soon on the ground and the production of gold began. This quartz carries a free milling gold. Gold, silver, lead and zinc are also found in the copper sulphides. The centre of this district is about 60 miles north of The Pas. Before it can be properly developed, railway extension from The Pas is necessary, and the construction of a smelter is essential for the recovery of the Flin Flon values.

Rice Lake District.—The Rice Lake district is reached from Winnipeg, which is its headquarters, and is only about 100 miles distant. Transportation by water or rail is available from Winnipeg to lake Winnipeg and by steamboat across the foot of the lake to the mouths of the Manigotagan or Wanipigow rivers. These may be ascended by canoe, or a newly constructed wagon road followed. Gold is the mineral chiefly sought and great numbers of quartz claims have been staked.

The centre of the quartz-bearing region is about 30 or 35 miles east of lake Winnipeg on the Manigotagan (Bad Throat) and Wanipigow rivers and connecting chains of lakes. The Oiseau River district might also be included. Prospecting has been carried on since about 1910 and on some claims considerable development has been accomplished. Recent reports state that a stamp-mill is being erected on the Gold-Pan, one of the best known claims.

Boundary District.—The Boundary district, as the name implies, adjoins the Ontario boundary in the vicinity of Shoal lake. It is reached from a small station, Ingolf, on the Canadian Pacific railway, a few miles to the east of the Ontario-Manitoba boundary. Like the Rice Lake district, the Boundary district has its headquarters at Winnipeg. It includes the well known West Hawk lake, Star lake and Falcon lake mineral regions.

Mineral deposits of a great many types have been found, none of which have attained as yet any commercial importance. Auriferous quartz veins were the first to receive attention, followed by several kinds of sulphides. Later quite a unique variety of minerals were found, including gold, bismuth, tin, galena, sphalerite, chalcopyrite, pyrite, pyrrhotite, arsenopyrite, molybdenite, bismuthenite and other ore minerals, together with many interesting gangue minerals in a variety of associations. The latest interest, in the economic possibilities of the district, according to Prof. de Lury of the University of Manitoba, has centred about occurrences of molybdenite and scheelite.

Minerals in Manitoba.—Space will not permit of a fuller description here of the many areas showing indications of the presence of minerals, or of the wide range of minerals found in the province. The Geological Survey of Canada, Ottawa; the Publicity Commissioner, Provincial Government, Winnipeg; the geological department of the University of Manitoba, Winnipeg, and the Commissioner of Northern Manitoba, The Pas, are the sources from which information relating to Manitoba's minerals may be obtained. Following is a list of the principal minerals and mineral products discovered or produced in Manitoba, with very brief notes on their location and other interesting features.

Coal.—D. B. Dowling, of the Geological Survey of Canada, reports as follows*:—

"The elevation called Turtle mountain, near the international boundary in Manitoba, rises above a plain of denudation which is underlain by shales of the upper part of the

* Coal Fields of Manitoba, Saskatchewan, Alberta and East British Columbia.

Cretaceous. The hill is composed mostly of sandy beds belonging to the top of the formation, some of which are undoubtedly of the same age as the Edmonton series. Lignite seams have been found near the base where the surface deposit is easily penetrated. Higher up the slope there is thicker mantle of drift, and owing to their being less settlement on the higher ground, this part remains unprospected, so that the known occurrences are as yet confined to the lower slopes. On the summit of the hill coal is reported in two places. The thickest seam so far found is between 6 and 8 feet, representing 5,000,000 to 7,000,000 tons per square mile. The available area so far known does not exceed 48 square miles, but if only a workable seam of 4 feet were found, the available coal for this area would be 160,000,000 tons."

This coal is lignite and no operations, other than minor local ones, have been carried on.

Copper.—Manitoba's production of copper has all been from the Mandy mine, at Schist lake in northern Manitoba. Other copper deposits are at Flin Flon lake nearby, on Athapapuskow, Copper and other lakes, in the same area; at Pipestone lake on the East river, between lake Winnipeg and the Nelson river; on the Oiseau river, 85 miles northeast of Winnipeg, where copper and nickel-bearing sulphides occur, and again on the Maskwa river, 10 to 15 miles away; and finally on lake Winnipeg, near the mouth of Wanipigow river.

Gold.—Gold in Manitoba is mined in the form of a purely gold-bearing rock and also mixed with other metals. The combined copper-gold-silver ore of the Mandy mine is an example of the latter.

Deposits occur as follows: Athapapuskow lake—quartz stringers occur; Flin Flon lake—values in gold have been obtained in quartz veins as well as in mixed metal ores; Elbow lake—a dyke with gold freely distributed has recently been discovered; Copper and Brunne lakes—quartz lode has gold values; Wekusko lake—gold-bearing quartz occurs and numerous claims have been opened up; Rice Lake district—gold-bearing quartz veins are fairly distributed throughout the area, and a great many claims have been staked and considerable development work done; Star lake—a reef of granite bears gold; Oiseau river, flowing into Lac du Bonnet, on the Winnipeg river—a large deposit of gold-bearing quartz.

Gypsum.—The production of gypsum in Manitoba in 1920 reached a total of 44,371 tons, valued at $487,894. In 1921 some 50,000 tons were quarried, 30,000 tons of which were made into plaster of Paris, 2,000 tons into wall board and the balance was sold to cement companies.

The mine of the Manitoba Gypsum Company at Gypsumville, on the Canadian National railway, 170 miles northwest of Winnipeg, is the source of supply. The total area exposed at this place is 5 square miles and outcrops lie at various points in an area of 36 square miles.

Other deposits occur at Dominion City, township 2, range 3, east of the principal meridian, where thick beds of excellent gypsum occur at a depth of 352 feet. Gypsum has been reported in bores at Neepawa, Gladstone, and at numerous other points.

Granite.—A deposit has been worked at Rabbit Point, on the east shore of lake Winnipeg, at the north end of the narrows. The stone is hard and compact and of a dark greyish-red colour.

Quarries of red granite are also being developed 75 miles east of Winnipeg and a fine red granite occurs on the first expansion of Grass river, below Reed lake, northern Manitoba, while numerous other deposits have been reported in the north country.

Iron.—Occurrences of iron ore, though not of economic importance, have been noted at Riding mountain, while a report on a deposit at Black island, lake Winnipeg, states that large outcroppings of hematite of good quality are found there. Other deposits exist at Star lake in the Boundary district, and at Oxford and Knee lakes in northern Manitoba. It is doubtful if these deposits are of present economic value.

Limestone.—Manitoba, in 1920, produced building stone valued at $275,661, and ornamental stone at $6,804. The whole, combined with rubble, crushed and furnace flux, reached a total of $374,286. The greater part of this output was limestone.

The premier building stone of the province is the thick-bedded, mottled Trenton limestone, outcropping at Tyndall and Garson, 29 miles east of Winnipeg and commonly known as Tyndall stone. This stone was used for the parliament buildings at Winipeg and Regina, and for the interior of the new Dominion Parliament building at Ottawa.

Limestone quarries have also been opened at Stonewall, Oak Point, Stony Mountain, Moosehorn and Hecla island, lake Winnipeg. Most of the lime used in the province is calcined at Oak Point, Moosehorn, Stonewall, and Tyndall. During 1921 Moosehorn shipped an average of six carloads per week of high calcium limestone to pulp and paper companies in Canada. Stonewall shipped magnesium limestone to Port Arthur and magnesium lime to Cochrane.

In addition to the numerous deposits around lakes Winnipeg and Winnipegosis, many exposures of limestone are found north of the lakes, along the line of the Hudson Bay railway. It will prove of great value for fluxing when the smelting of the ores of this district is undertaken.

Lead.—Lead occurs in the mixed ore of the Flin Flon area in northern Manitoba; in galena, at Wanipigow lake, near Nelson House; and sparingly in the form of galena, at Wekusko lake.

Molybdenum.—Deposits of molybdenum exist at Falcon lake in the Boundary district; Little Playgreen lake, near the exit of the Nelson river from lake Winnipeg; on the Echimanish river, between God's lake and Island lake; and the west bank of Grass river, near Wekusko lake. Little investigation has been made of these deposits. Discoveries have also been reported in the Bird River district.

Oilshale.—Large deposits exist at Riding, Duck and Porcupine mountains which promise to be commercially valuable. Analysis of samples have shown an oil content of nine gallons to the ton. Other deposits occur at Cowan, west of lake Winnipegosis, in the Pasquia hills, just over the Saskatchewan border.

Petroleum and Natural Gas.—While Manitoba does not contribute any of Canada's small output of petroleum, there are indications, in several parts of the province, that it will eventually become a producer. A few miles south of Manitou, in the Pembina River valley, two wells were drilled. They were not completed but a showing of gas was obtained in each. A well at section 16, township 28, range 16, west of the principal meridian, known as the McKay well, obtained a small amount of thin filtered petroleum covered by 42 feet of boulder clay. During 1920, oil strikes were reported in the Duck mountain area, 40 miles north of Dauphin, and in the Porcupine forest reserve. Apparently these have not proved of commercial value. Natural gas strikes have been made at Treherne and Melita. That at Treherne has been used on a farm and that

at Melita to supply a mill. A test well at lake Winnipegosis found slight indications of oil at 430 feet in 1921. This drill was set up by the Provincial Government on the top of a dome 39 feet above the lake, on section 29, township 30, range 17, west of the principal meridian. Favourable indications have also led to drilling at Mafeking, on the Canadian National railway, west of lake Winnipegosis. Large areas have been staked in the Pasquia hills and one drill has been taken in.

Peat.—Manitoba possesses a possible fuel supply in the form of peat. The total area of the principal bogs examined is estimated at 6,530 acres and the volume of workable peat at 1,863,170 tons of fuel with 25 per cent moisture content and 2,553,110 tons of litter with contents 20 per cent moisture.

Clay.—The best brick clays of Manitoba occur in the former bed of glacial lake Agassiz. Raised benches at various levels are still preserved for long distances on the eastern slopes of Pembina, Riding, and Duck mountains, marking what were once the western shores of this great body of water. The clays used for brick-making in Manitoba are usually surface clays and more or less calcareous in nature. They burn to a buff colour.

The principal producers of common brick are found at Winnipeg, Morris, Carman, Portage la Prairie, Virden, Hartney, Brandon, Somerset, Souris, Neepawa, Birnie, and Gilbert Plains. Drain tile has been manufactured at Russell, Virden, and Winnipeg, and clay hollow building blocks at Winnipeg.

Amber.—A substance resembling amber has been found on the shores of Cedar lake, near the northern end of lake Winnipegosis. Analysis has shown, however, that the deposit differs somewhat from true amber, and it is of doubtful economic value. "Chemahawinite" has been suggested as a name, from the name of a nearby post.

Salt.—Although not a producer at the present time, Manitoba possesses a large number of brine springs at some of which salt has been manufactured in a more or less primitive manner and sold to the early settlers and traders, as well as to the Indians, since the year 1820. Areas in which brine springs are found are those adjacent to lakes Winnipegosis and Dauphin, the Westbourne district, and in the vicinity of Winnipeg.

Silver.—The present production is obtained from the silver-copper-gold ores of Schist lake, Athapapuskow lake, Flin Flon, and the Copper King mine on the Hole river, a tributary of lake Winnipeg. Some promising silver-lead ore has been found near the northwest end of Herb lake. Galena, carrying 25 ounces of silver to the ton, has also been reported from a lake north of Nelson House, near the divide between Burntwood and Churchill rivers.

Cement.—The Canada Cement Company, Limited, has a plant at Tuxedo, near Winnipeg, with a daily capacity of 3,500 barrels. This will use limestone. The capacity of the Commercial Cement Company, Limited, at Babcock, about 20 miles west of Carman, is 225 barrels per day. The material used is a natural cement.

Platinum.—Values of platinum have been obtained at the Caribou claims, on the west side of Brunne lake, north of Cranberry lake; at and near the town of The Pas, all in northern Manitoba; and at Star lake in the Boundary district.

Tin.—The occurrence of tin has been reported from West Hawk lake in the Boundary district, where it is found in sulphides.

Tungsten.—The presence of tungsten has been reported in the Boundary district. A small quantity has been shipped from Falcon lake.

Water-Powers*

Of the three prairie provinces Manitoba is the most abundantly endowed with water-power resources. Several of these water-powers have been developed, notably two on the Winnipeg river, which have proved of vital importance to the industrial expansion of the city of Winnipeg and its environs. While many of the water-powers are at present somewhat remote from the more thickly settled parts of the province, they are for that reason more particularly important for the exploitation of the natural resources of the hinterland. Of the larger powers, such as those of the Nelson river, which amount to some two and a half million horse-power, we can confidently expect that, with the great advances being made in the art of electrical development and transmission, most of them will in time prove to be important factors in the solution of the fuel, power and industrial problems of the province.

Administration.—The water-powers of the province of Manitoba are administered by the Dominion Water Power Branch, Department of the Interior, under regulations pursuant to the Dominion Water Power Act, 1919. These regulations provide for the development of the water-power resources in a way which will ensure the power needs of the province being met to the best advantage in the public interest under full government control of rates, rentals, and conditions of development. Concessions are only made for limited periods to *bona fide* applicants capable of prosecuting the development to a successful issue. Application for water-power privileges in Manitoba should be addressed to the Director of Water Power, Department of the Interior, Ottawa.

Developed Water-Power.—The more important water-power developments in Manitoba are confined to the Winnipeg river, which provides two hydro-electric developments of the major class; the 35,600-horsepower plant of

HYDRO-ELECTRIC GENERATING STATION, POINT DU BOIS, MANITOBA

This 67,000-h.p. plant, owned by the city of Winnipeg, is located on the Winnipeg river 73 miles northeast of the city and furnishes the citizens with a cheap and dependable supply of electric energy.

the Winnipeg Electric Railway Company on the Pinawa channel, serving Winnipeg, 58 miles distant, with light and power, in conjunction with a steam plant supplying the power requirements of the electric railway company; and the municipal power plant of the city of Winnipeg at Point du Bois, also sup-

* Data for this section were prepared by C. H. Attwood of the Dominion Water Power Branch, District Chief Engineer in charge of the Manitoba district.

plying Winnipeg, 73 miles distant, with light and power. The municipal plant has installed at the present time 67,100 turbine horse-power and is designed for an ultimate capacity of 100,000 horse-power. Other municipalities served by these two plants include Middlechurch, St. Pauls, Rockwood, Lockport, St. Andrews, Stonewall, St. Vital, St. Norbert, Selkirk, Transcona, Kildonan, Ft. Garry, St. Boniface, Beausejour, Oak Point, and Birds Hill.

Provincial Transmission Line.—In 1920 the Manitoba Power Commission, under authority of the Manitoba Electrical Power and Transmission Act of 1919, constructed a 60,000-volt, steel-tower transmission line from Winnipeg to Portage la Prairie, 60 miles distant. In 1921 the Commission extended the provincial system by tapping the Winnipeg-Portage line at Oakville and building a steel-tower line to serve the municipalities of Carman, Roland and Morden. In 1922 it is proposed to extend the system from Portage to Brandon; from Portage to Gladstone, and from Carman to Morris. The Manitoba Power Commission purchases power for distribution from the city of Winnipeg Hydro-Electric System delivered at the terminals in Winnipeg.

On the Minnedosa river are located two hydro-electric power stations; the 1,000-horsepower plant of the Canada Gas and Electric Corporation, 10 miles from Brandon, serving the municipality of Brandon, in conjunction with a steam plant in Brandon; and a small water-power plant at Minnedosa, serving the town of Minnedosa, in conjunction with a small fuel plant.

Manitoba Power Co.—The Manitoba Power Company, a subsidiary of the Winnipeg Electric Railway Co., is now busily engaged in the construction at Du Bonnet, or Great Falls, on the Winnipeg river, of a hydro-electric power development which will ultimately have a continuous 24-hour capacity of some 95,000 horse-power with a turbine capacity of 168,000 horse-power of which two units totalling 56,000 horse-power have been completed. It is contemplated that power from this plant will be used in Winnipeg, and in the establishment of local industries. The question of hydro-electric power development in other parts of the province is being actively canvassed, the more important locations being at Grand Rapids on the Saskatchewan, and in the mining districts of the Flin Flon area, and along the eastern shore of lake Winnipeg.

The total turbine capacity installed and under active construction in Manitoba is 159,825 horse-power. The principal features are listed in the following table:—

DEVELOPED WATER POWER IN MANITOBA

River	Company or Owner	Location of Plant	Head in Feet	Present installation, h.p.	Ultimate installation, h.p.
Winnipeg..	City of Winnipeg.....	Point du Bois.....	46	67,100	101,600
Winnipeg..	Winnipeg Electric railway.	Pinawa Channel.....	40	35,600	35,600
Winnipeg..	Manitoba Power Co.*.....	Great Falls.....	56	56,000	168,000
Minnedosa.	Canada Gas and Electric Co.	Near Brandon.....	33	1,000	1,000
Minnedosa.	Manitoba Power Commission.	Minnedosa.....	22	125	125
		Total.....	.....	159,825	306,325

*Under construction.

Undeveloped Water Power.—Engineers of the Dominion Water Power Branch of the Department of the Interior through the district office in Winnipeg have for several years past been engaged in a thorough investigation of the water-power resources of the province. Detailed examinations of the more important and more accessible power sites and power rivers have been supplemented by reconnaissance investigations of the water-powers of lesser importance, or those located in the more remote districts, and by systematic hydrometric investigations. As a result there have been collected and collated sufficient data to permit of a fairly accurate and comprehensive estimate being made of the power possibilities of all the important power rivers of the province. Concurrent with, and correlated to, the power investigations has been the systematic work of gathering stream-flow data carried on by the engineers of this branch. Run-off data for the most of the more important streams throughout the province are now available for utilization in the study of the many problems connected with water-power, water supply, drainage, flood control and reclamation.

The power resources of the Winnipeg river were among the earliest to receive detailed examination and the investigations established the fact that there was available along the Winnipeg river some 450,000 continuous 24-hour power.

LYNX FALLS, GRASS RIVER, MANITOBA

One of the many water-power sites in Northern Manitoba

The power is feasible of development at nine sites, all of which form most desirable projects from both engineering and economic viewpoints. Two of these sites are developed and a third is in course of development.

Nelson River Powers.—The rivers flowing into lake Winnipeg from the east offer a great number of opportunities for ideal developments of small size suitable for local use and for use in the mineral areas. Similar power sites, some of which are of substantial size, are available on the western tributaries to the lake. The Saskatchewan river, entering lake Winnipeg at the north

through Demi Charge, Flying Post and Grand Rapids, presents exceptional opportunities of extensive and economic hydro-electric power development. Northern Manitoba is traversed by two power rivers of outstanding importance: the Nelson and Churchill. The Nelson river receives the run-off collected by lake Winnipeg from the Saskatchewan, Dauphin, Red and Winnipeg river systems. This enormous lake area, in conjunction with lakes Winnipegosis and Manitoba, provides a magnificent natural regulation on the Nelson river discharge and makes possible a development of from 2,500,000 to 3,500,000 horse-power.

Churchill River Powers.—The Churchill river likewise provides enormous power possibilities, while the Grass, Burntwood and other rivers throughout the northern area are rich in water-power.

The total power possibilities of the province at known sites or drops as at present estimated by the engineers of the Dominion Water Power Branch at ordinary minimum flow is 3,176,668 horse-power, and for maximum development 5,234,797 horse-power, the details of which are summarized in the accompanying table. The figures for horse-power are calculated on the basis of 80 per cent efficiency.

UNDEVELOPED WATER POWER IN MANITOBA

River	Horse-power at 80% Efficiency		Dependable with Storage
	Estimated Minimum Development	Estimated Maximum Development	
Assiniboine	243	1,187	
Berens	11,450	18,570	13,305
Big Black	5,139	8,339	
Bloodvein	4,100	6,660	
Burntwood	9,060	27,185	20,200
Churchill	325,500	467,600	
Dauphin	16,960	19,540	23,405
Fairford	2,635	3,030	3,640
Grass	5,131	15,380	
Hayes	7,611	22,833	
Manigotagan	784	1,618	2,975
Minnedosa	113	640	
Mossy	284	795	1,000
Nelson	2,443,320	3,948,170	3,664,760
Pigeon	24,880	40,420	28,037
Poplar	3,885	8,286	
Red	1,060	4,400	
Saskatchewan	58,614	197,445	147,276
Shell	20	52	
Wanipigow	405	1,100	
Waterhen	5,684	6,547	7,840
Winnipeg	249,790	435,000	232,305
Total	3,176,668	5,234,797	4,144,743

Note.—This table represents the estimated total power at sites concerning which some record is available.

To sum up, it may be said that Manitoba is magnificently endowed with water-power resources the development of which will be of vast benefit to the industrial and commercial, as well as to the domestic, life of the province. The

location of certain of these available powers in respect to present centres of population is favourable to their early development, while those in the more remote districts, properly investigated and utilized, will provide the means for exploitation of natural resources now awaiting development. Each power site or prospect requires, however, individual consideration of all circumstances and conditions pertinent to its development before its economic value to the community can be definitely determined.

Wild Life

The wild life of Manitoba, or more specifically the game and fur-bearing animals and game birds, constitute a natural resource of great value, the possession and administration of which are vested in the Provincial Government. For 250 years these wild-life resources have been exploited and have yielded, in meat, hides and fur, revenues of no mean value. When Manitoba was established as an infant province, the fur trade had already held sway for two centuries, representing practically the only commercial industry prior to this date and being primarily responsible for the advance of civilization into these regions. The length of the fur-trade period is thus five times that of the provincial era, and, barring certain exceptions, the wild-life resources are by no means exhausted.

Value of Furs.—Lack of records makes it exceedingly difficult to form an accurate estimate of the commercial value derived from the exploitation of Manitoba's wild life, but the returns for the year 1920 place the value of the fur catch at over $3,000,000. The significance of these figures is worthy of consideration. After 250 years of toll, the fur-bearing animals of the province are still able to enrich it in a single season to the extent of $3,000,000. Taking only one-third of this sum as a conservative annual estimate, the total value of furs produced in Manitoba would amount to $250,000,000. This is in excess of the total gold output of the renowned Cariboo and Klondike fields.

Value of Wild Life.—The advantages of wild life are threefold. First, is the value of the living animal or bird—and in this regard may be mentioned the economic value of insectivorous birds in relation to agriculture. Second, is the value of the slaughtered animal or bird—the meat or food value, the hides, fur, horns or other product. The third value, and one that is often overlooked, is that which wild life gives to the human race in the form of increased outdoor activity and pleasure, in the study of its habits or in its capture.

The economic value of Manitoba's wild life might be considered under four headings to include the following species: (1) big game animals, (2) fur-bearing animals, (3) game birds, (4) insectivorous birds. In addition to this must be mentioned the song birds and many species of non-game migratory birds of beneficial habits. On the adverse side of the sheet will be shown a comparatively few species of smaller animals and birds of destructive habits and small economic value.

Of the big game animals now found or formerly prevalent in Manitoba, may be mentioned the buffalo, moose, elk or wapiti, caribou (both barren ground and woodland), deer (red and mule), and antelope. Of these, the buffalo and antelope are extinct in Manitoba save for a few specimens in captivity. The elk is in danger of a like fate.

Buffalo.—No description of the buffalo is necessary. So recent has been its extermination and so tragic its fate that its characteristics are indelibly

impressed on the minds of those who have any acquaintance with Western Canada. For ages it roamed over the prairies of Western Canada in herds of countless thousands and was practically the sole support for the bands of North American Indians inhabiting these regions. These majestic monsters, technically known as the *Bison Americanus*, were the noblest of all North American mammals. Their shaggy heads, huge shoulders and tremendous weights gave them a unique distinction and undisputed sovereignty among the wild life of the continent.

Their slaughter was most wanton and unwarranted. The advent of the white man with his rifle made their killing easy, and later, the building of railways made possible the commercial exploitation of their hides. Buffalo were slaughtered in thousands for their hides, which were sold by the hunters for as little as one dollar each. Later, as a grim reminder of the tragedy of extermination, great quantities of buffalo skulls and bones that lay bleaching on the prairies were gathered together and piled along the newly constructed railway sidings like cordwood. They were sold at from $5 to $7 a ton and shipped to American cities to be utilized in the manufacture of bone charcoal. The transforming of the prairies into grain fields would, no doubt, have spelt the doom of the buffalo, which would have been pushed back by the gradual advance of settlement, but its ruthless slaughter was entirely unnecessary.

Moose.—The moose is now the largest game animal found in Manitoba. It is the North American representative of the largest member of the deer family, and in Northern Europe and Siberia it is known as the elk. The moose is a most magnificent animal the chief charcteristics of which are its broad spread and wide flat antlers, which sometimes measure from 60 to 72 inches across. The head is one of the most prized trophies of big-game hunters. The flesh is of high food value and forms the principal meat diet for many tribes of Indians. The hide is highly valued by the Indians. It is dried, smoked, tanned and utilized for moccasins, gloves and other articles of clothing. Moose are fairly abundant in Manitoba, being found chiefly in the northern and eastern sections of the province.

Elk.—The wapiti *(Cervus canadensis)* or elk, as it is better known in Canada, ranks next to the moose in size, but has a more striking and handsome appearance. In earlier days it ranged extensively throughout the greater part of Canada and was quite abundant in Manitoba. Like the buffalo, however, it was ruthlessly slaughtered and has narrowly escaped the fate of the former. Its economic waste was most deplorable when it is remembered that these noble animals barely escaped extermination merely for the sake of their teeth. Elk or wapiti are now found in restricted areas in Manitoba and it is hoped that the commendable action of the Provincial Government in establishing a closed season will result in saving this animal from total extinction. None are found east of Manitoba, but a number roam between lakes Winnipeg and Manitoba and in the Riding Moutain Game Reserve.

Caribou.—Two species of caribou are found in Manitoba, the barren ground *(Rangifer arcticus)* and the woodland *(Rangifer caribou)*. The caribou of Northern Canada are found to-day in herds that rival in numbers those of the buffalo of earlier days. It is to be hoped that the lesson taught by the extermination of the buffalo will have its effect in preventing a like fate befalling this animal, though it would appear that much unrestricted slaughter is, however, playing havoc with these northern animals. The caribou is a comparatively small animal but its food value is important.

In their winter wanderings southwards the caribou of the northern regions come as far as the extreme northern parts of Manitoba. They visit Reindeer lake and the country north of Churchill river in large bands, the trading posts at Du Brochet and Churchill reporting considerable business connected with their taking. The woodland caribou in lesser numbers are found as far south as the Saskatchewan river and occasionally to the south of it. The woodland caribou is the largest of its species. Its meat is very palatable and its hide dresses to good advantage giving, according to different processes of treatment, an excellent parchment or a fine soft white material of a texture similar to the chamois.

Deer.—Two species of deer are fairly prevalent in Manitoba, the red or white-tail and the mule or jumping deer. Of these, the mule deer is the largest species and is so named because of its large mule-like ears. It is also called the jumping deer from its peculiar gait. The red deer is so called from the colour of its summer coat. It is also known as the white-tail or cotton-tail deer from the distinctive colouring of its tail and the manner in which it is carried erect when in flight. While these deer were scarce a few years ago, the protection given them by the game department is reflected in their increasing numbers. The graceful antelope, or prong-horn, which is a characteristic of the western prairies, once inhabited the southern part of Manitoba. It disappeared westward many years ago, and, like the elk, is in danger of total extermination.

Bear.—The fur-bearing animals of Manitoba include a wide range of species from the bear to the ermine. Of bears the black is fairly common in all unsettled parts of the province. An occasional polar bear is seen at Nelson or Churchill but they are reported very scarce in Hudson bay. Grizzly bears were reported by early fur traders as far east as lake Winnipeg, but are seldom found in Manitoba to-day.

Fur Bearers.—The most important fur-bearing animals of land and water variety are the beaver, otter, fisher, marten, mink and muskrat. Of land animals there are the wolf, coyote, fox, including black, silver, cross, white and red species, lynx, wolverine, skunk, and ermine or weasel as it is known by its summer name. The rabbit, though not producing a fur of high value, has an economic bearing on the general fur situation of the year. Foxes and lynx particularly depend on the rabbit for sustenance. The extent of the fur trade of Manitoba may be better realized from the following table which shows the catch for the winter of 1919-20. It will be observed that muskrats account for over one-third the value of the catch. In the lower Saskatchewan and Upper Nelson valleys Manitoba has a great area most admirably suited to the rearing of this prolific species.

FUR CATCH IN MANITOBA, 1919-20*

Kind	Number of Pelts	Total Value	Average Value per Pelt
		$	$
Badger	2,217	2,662	1·20
Bear, black	906	12,300	13·58
Bear, brown	148	2,081	14·06
Bear, grizzly	5	108	21·60
Bear, white	21	672	32·00
Bear, not specified	7	70	10·00
Beaver	15,421	390,262	25·31
Coyote	15,407	270,884	17·58
Ermine (weasel)	118,168	160,270	1·36
Fisher or pekan	1,386	131,206	94·66
Fox, cross	521	31,979	61·38
Fox, red	3,070	83,578	27·22
Fox, silver	151	31,326	207·46
Fox, blue	7	560	80·00
Fox, white	1,450	56,744	39·13
Fox, not specified	25	53	2·12
Lynx, including wild cat	1,295	42,151	32·55
Marten	6,928	281,059	40·57
Mink	16,779	243,078	14·48
Muskrat	518,288	1,192,940	2·30
Otter	3,691	59,343	16·08
Rabbit	1,694	368	0·22
Raccoon	661	3,135	4·74
Skunk	10,676	40,393	3·78
Squirrel, grey	57	3	0·05
Wolf	5,438	84,575	15·55
Wolverine or carcajou	277	6,690	24·15
Caribou	4	7	1·75
Deer	91	124	1·36
Elk	29	92	3·17
Moose	456	1,879	4·12
Moles	106	13	0·12
House Cat	25	14	0·56
Civet Cat	16	8	0·50
Total value	.....	3,130,627	

*From data supplied by the Dominion Bureau of Statistics.

Game Birds.—Of game birds, both land and water species are fairly well represented. Of the former, two favourite species of grouse are found, namely, the ruffled grouse, or partridge, and the pinnated grouse, or prairie chicken. These were formerly very plentiful, especially the prairie chicken, which was almost as much a peculiar feature of the prairies as the buffalo; but in recent years they have become so scarce that the Government has wisely imposed a closed season affecting them. The sharp-tail grouse and the spruce grouse are found in unsettled portions of the province and the ptarmigan in the far northern part.

Wild geese, wild ducks, golden plovers, brent, snipe, woodcock and yellow legs are fairly plentiful and widely distributed and may be hunted during the latter part of September and in October and November. Swans, cranes of several species, wood ducks, eider ducks and sandpipers are less numerous and are protected by a closed season.

Protection Afforded.—The Game Protection Act of Manitoba applies to all big game and fur-bearing animals and game birds, the hunting, taking or capture of which is restricted to certain seasons as defined by the Act and under certain conditions. Licenses must be secured before any species of wild life may be molested. Certain royalties are collected on furs and certain fees for licenses to hunt. The province derives an income of upwards of $100,000 annually from these sources.

Under the Insectivorous Birds Act all insectivorous and migratory non-game birds and their nests and eggs are protected at all times. The Migratory Birds Convention Act also stipulates certain protection for migratory birds as agreed upon by the Canadian and United States Governments. All animals and birds within the provincial game preserves are also protected from molestation. The Provincial Police and the Royal Canadian Mounted Police, assisted by additional game wardens, are entrusted with the enforcing of the protection of Manitoba's wild life, and it is hoped that the steps thus taken to safeguard this available source of wealth will guarantee its permanency.

Manitoba is also favoured with many species of beautiful and attractive song birds which add much to the enjoyment of the great out-of-doors and exercise a beneficial influence on the growing crops.

The birds of prey or species of other birds or mammals destructive to other wild life or to farm property are comparatively few in number. Wolves rarely encroach upon inhabited territory. The coyote and the gopher are the chief enemies of the grain-grower and farmer and radical steps are being taken to lessen this evil. Crows are about the only birds whose destructive habits are worthy of mention. On the whole, the wild life of Manitoba represents a most valuable asset and one which under proper control will have an ever-increasing usefulness.

Fisheries

The inland waters of Manitoba are nearly 20,000 square miles in extent. Almost half this water area is included in lake Winnipeg alone, the length of which is over 250 miles. Lake Winnipegosis accounts for over 2,000 square miles, lake Manitoba for nearly as much and South Indian lake, an expansion of Churchill river, for over 1,500 square miles. Two large lakes, which lie principally in adjoining provinces, extend across the boundary lines to share their waters with Manitoba, namely, Lake of the Woods and Reindeer lake. The former lies on the extreme western boundary of Ontario and southeastern angle of Manitoba and the latter is on the Manitoba-Saskatchewan boundary in their far nothern parts. Namew lake is farther south on the same boundary line, being a little north of the Saskatchewan river. Fodarta lake is on the 60th parallel of north latitude. Some 156 square miles of its area lies in Manitoba and the remainder falls in the Northwest Territories.

Water Area.—The lakes mentioned above give to Manitoba an inland water area of 15,255 square miles. Other lakes exceeding 100 square miles in area are: Etawney, 625 square miles; Moose, 552 square miles; Island, 551 square miles; Granville, 392 square miles; Gods, 319 square miles; Cedar, 285 square miles; Playgreen, 224 square miles; Dauphin, 200 square miles; North Indian, 184 square miles; Cormorant, 141 square miles; St. Martin, 125 square miles; Kiskittogian, 122 square miles, and Shoal, 102 square miles. These bring the total inland water area slightly over 19,000 square miles. To this must be added the hundreds, or thousands, of small lakes that are particularly numerous in the northern and more rugged parts of the province. It is, there-

fore, quite safe to quote the inland water area of Manitoba as comprising, in round numbers, 20,000 square miles; and all these waters are more or less liberally stocked with several species of valuable fresh-water fish.

Hudson Bay.—Further, it must be borne in mind in considering fisheries resources, that Manitoba has some 440 miles of shore line on the salt waters of Hudson bay. Though, strictly speaking, Hudson bay forms part of the Northwest Territories, the utilization of the fishery resources of the waters adjacent to Manitoba ports would be prosecuted from her shores and would add to her industrial activity. The completion of the Hudson Bay railway would open the way for the commercial exploitation of these waters.*

Value of Fisheries.—Like the wild life of the forests and plains, the fisheries of Manitoba constitute a valuable resource of a permanent character. For 250 years their economic value as an important item of food has been

WARREN'S LANDING, LAKE WINNIPEG

The fishing industry of the northern portion of the lake is centred at this port.

taken advantage of. During the fur-trade period and the lean years encountered by the early settlers, this was no mean consideration. In more recent years a commercial fishing industry has become firmly established on those inland waters within reasonable reach of railways. The annual value of such products has exceeded $1,000,000 for several years. Trade centres in Winnipeg and the bulk of the produce is exported in carload lots to cities in the United States.

The inland fisheries of Manitoba rank among the most extensive in the world but the fishing industry is only in its infancy. When the many great lakes of outlying regions, which are now unexploited, are made accessible by

* Since the foregoing was written the Dominion Government has committed itself to the policy of ultimately completing this railway.

the extension of transportation lines a great impetus will be given the industry. At present Lake Winnipeg produces half the fish caught in the province. Its close proximity to Winnipeg and ample transportation facilities both by rail and water make it a favourable field. Other fishing sections are: Buffalo bay on Lake of the Woods; lake Winnipegosis, lake Manitoba, lake St. Martin, lake Waterhen, Red Deer lake, and the district centring about The Pas. Numerous extensive lakes in northern areas, producing excellent fish, are still beyond the reach of commerce.

Fish Fauna.—The fish fauna of Manitoba is also interesting, apart from its commercial value, in that it has a distinctiveness shared only with its sister Prairie Provinces. It is quite distinct from that of the Great Lakes and Eastern Canada and the contrast with that of the Pacific coast is even more marked. Though its principal commercial species are rather few in number, the varied species found cover quite a wide range. Professor E. E. Prince, Dominion Commissioner of Fisheries, in 1909, reported some 53 species, representing 15 families, and stated the possibilities of additional discoveries being made. He also makes the interesting statement that the fish fauna of Manitoba is in harmony with the theories of geologists as to the pre-historic stages of development of the province.

FISHES OF MANITOBA*

Northern Lamprey.
Lake Sturgeon.
Common Sturgeon.
Channel or Spotted Catfish.
Great Lake Catfish or Mathemeag.
Dark Catfish.
Common Bullhead or Horned Pout.
Buffalo-fish.
White or Small Mouth Buffalo-fish.
Northern Sucker.
Common White Sucker.
Quillback Sucker.
White-nosed Red Horse.
Mullet or Red Horse.
Northern Red Horse.
Silver Minnow.
White Minnow.
Fathead or Bull Minnow.
Straw-coloured Minnow.
Shiner, Spawn Eater.
Poor Minnow.
Great Minnow.
Storer's Minnow.
Western Gold-eye.
Moon-Eye.
Shad Moon-Eye.
Common Lake Whitefish.
Labrador Whitefish.
Great Lake Trout, Touladi or Grey Trout.
Tullibee or Mongrel Whitfish.
Jack-fish or Pike.
Maskinonge (erroneously Muskellunge).
One-spined Stickleback.
Brook Stickleback.
Trout Perch, Sand Roller.
Calco Bass.
Green Rock Bass.
Small Mouth Black Bass.
Large Mouth Black Bass.
Yellow Pickerel, Pike-perch or Dore.
Grey Sauger or Pike-perch.
Yellow Perch.
Black-sided Darter.
Gunther's Darter.
Johnny Darter.
Northern Darter.
Sheephead or Lake Drum-fish.
Olivaceous Miller's Thumb.
Ling, Burbot, Lake Cusk, Losh and Methy.

Commercial Species.—Of these the best known and most abundant commercial fish is the whitefish. It is taken and marketed at all times of the year and has become a favourite dish wherever used. Pickerel is a close competitor, especially as regards quantity. Trout is very highly prized for its delicious flavour and high food value, but is not so abundant as the whitefish. Another species, highly prized by connoisseurs, is the sturgeon. It differs widely in physical characteristics and habits and is believed to have been, primarily, an anadromous ocean fish. Unfortunately, it is becoming scarce and its taking

* *The Fish and Fisheries of Manitoba* by Prof. E. E. Prince, Dominion Commissioner of Fisheries.

has therefore been limited considerably. These four species are considered the choicest commercial table fish of Manitoba.

Among the other species taken, gold-eyes, mullets and perch are all of excellent quality. Pike is a coarser fish though very common, and tullibee is an inferior species of whitefish. Small quantities of catfish are taken from lake Winnipeg.

The commercial catch of Manitoba fresh-water fish for the year 1920, with its value as marketed, is shown on the following table:—

CATCH OF FISH IN MANITOBA, 1920*

Kind	Quantity	Value
	cwt.	$
Catfish	240	2,760
Gold-eyes	4,593	33,274
Mixed fish	960	4,350
Mullets	22,028	49,514
Perch	671	7,210
Pickerel	39,070	355,358
Pike	25,535	137,622
Sturgeon	397	11,116
Caviar	200	400
Trout	463	4,167
Tullibee	33,386	201,844
Whitefish	43,358	441,992
Total	170,901	1,249,607

*From information supplied by the Dominion Bureau of Statistics.

The agencies of production in primary operations and in canning and curing are shown in the following table compiled from information contained in reports of the Dominion Bureau of Statistics. Unfortunately, no information is given concerning the numbers of men, horses and dogs engaged in transporting fish from winter camps to lines of railways. Frozen fish are hauled long distances and great numbers of teams are employed on this work, many homesteaders finding steady employment with their horses during the winter months.

EQUIPMENT USED IN FISHING INDUSTRY OF MANITOBA, 1920

Equipment Used	Number	Value	Men Engaged
		$	
Steam vessels or tugs	17	213,500	158
Sail and row boats	303	59,750	
Gasoline boats	11	6,200	542
Gill nets	19,213	330,260	
Lines	20	110	988
Piers and wharves	24	21,000	
Freezers and icehouses	55	113,300	
Small fish and smoke houses	38	19,000	
Fish-curing establishments	2	26,160	5
Equipment used in operations under settlers' permits		4,100	401
Total		793,380	2,094

Federally Administered.—The fisheries of the province are a federal resource and are administered by the Fisheries Branch of the Department of Marine and Fisheries, Ottawa. For purposes of local control and administration the province is placed in charge of a local inspector stationed at Selkirk, with a staff of overseers, and under the direction of a chief inspector for the prairie provinces whose headquarters are at Winnipeg. Commercial fishing is regulated to certain set seasons and subject to certain conditions and restrictions and can only be proceeded with under license obtained from the officers of the Fisheries Branch. In the enforcement of the regulations the inspectors are assisted by the police and other officials.

Fish Culture.—Fish culture is being prosecuted by the Dominion government at various points throughout the West. Hatcheries have been constructed at Selkirk, Gull Harbour, Dauphin river and Winnipegosis, Manitoba, and Fort Qu'Appelle in Saskatchewan. In 1920 over two hundred and thirty million eggs, fry or older fish were distributed from the Manitoba hatcheries in surrounding water, over two hundred million being whitefish spawn and over thirty million pickerel. The restocking of the waters where commercial fishing has been carried on for many years is an important undertaking, which, with regulations prohibiting excessive harvesting, will guarantee the permanency of the industry.

Great Potentialities.—The large non-agricultural regions of Manitoba constitute an inland fisheries field of unlimited possibilities. The numerous lakes and rivers, many of which, as earlier noted, are of vast proportions, with their deep, clear, cold waters, make an ideal and extensive district for the exploitation of inland fresh-water fisheries. The rugged nature of these northern districts is favourable to such an enterprise. The broken rocky surface of the ground, with forests of spruce and birch, lend to the numerous lakes and rivers a depth and clearness of water not found in the plains. Cool and shaded by summer and sheltered by winter, the waters are ideal for fish life. The numerous rapids from lake to lake keep the waters fresh and running. The forests breed insect life for fish food in summer and give shelter to the fishermen in winter.

Cold Enhances Quality.—The cold waters of the north produce a fish of a firmness and flavour not found in warm waters. Taken in winter time the fish is of exceptional quality. Winter fishing, especially for whitefish, is extensively practised. The fish are caught in nets placed below the ice. Frozen as soon as taken from the water they are packed in wooden boxes and shipped in this condition direct to the consumer. This is a noteworthy instance where the cold climate of a Manitoba winter serves an economic purpose.

The fish of outlying regions are playing an important part in the development of such districts. In the Northern Manitoba mining areas, which are now being actively prospected, winter travel is as yet practically restricted to dog sleighs. Fish in these district sections form the principal food item for dogs, the coarser varieties such as suckers being mostly used. Natives depend on the net for their existence. The chase may fail but the net seldom does. Even the white men who penetrate far from bases find this class of food indispensable.

Some Whales.—On Hudson bay there is but little activity, though some whaling has been done. At Nelson and Churchill the so-called "white whales" are fairly numerous. A few seals are also found. Among the fish found is an Arctic trout which is highly prized.

Economic Value.—The economic value of Manitoba's fisheries are fourfold. First is the commercial aspect—the business it creates, the wealth it adds to the province, the employment it offers and its local production of this valuable food. The second is its benefit to the settler, as a means of increasing his earnings in spare time and in the food it offers him within easy reach. To the Indian population the fisheries are now almost indispensable. In the development of distant areas and mineral and forest resources it will prove an important factor. . The fishermen, the settler, the Indian and the prospector all share in common the benefits derived from this great resource together with the province at large.

Lastly, the recreative and pleasure phases must not be overlooked. Disciples of Isaac Walton's would find Manitoba lacking if it did not provide their favourite holiday pastime. Among the game fish are several specimens of bass, trout and others that afford right royal sport. The introduction of additional favourites is possible and the stocking of attractive lakes in forest reserves and other holiday districts will decidedly enhance the value.

CHAPTER VI

Agriculture

AGRICULTURE was introduced to the great plains of Western Canada by the Earl of Selkirk, who wished to procure better living conditions within the British Empire for those classes of rural dwellers, and others, who were finding their lot growing more and more serious in the old land. The difficulties encountered by his colonists have been referred to in preceding pages. Beset by dangers, hardships and discouragements, the Red River colony suffered much adversity. It blazed the way, however, for an army of agriculturists that has amply vindicated the visions of Selkirk.

The Evolution of Farming

The Selkirk Colony.—It has been said that Selkirk's attempt at colonization was fifty years in advance of the times. True, from the year 1812, when his first settlers arrived at the junction of the Assiniboine and Red rivers, to the year 1870, when the province of Manitoba came into being, a period of 58 years, conditions were anything but favourable to the successful prosecution of agriculture on anything pertaining to a large or profitable scale. But prosperous conditions on the land are not brought about in a day, and to the early pioneers of Manitoba the present population owes a great debt for making possible the enviable position the province now holds in the agricultural world.

Primitive Methods.—The first attempts of the Selkirk colonists to cultivate the land were most primitive. Implements and seed were woefully lacking, and we are told that hoes were used to break up little garden plots in 1813. Many of the settlers had not even an elementary knowledge of farming. Their pluck and determination stood them in good stead and they were encouraged by the marvellous fertility of the soil, the luxuriant growth of natural vegetation, and the boundless expanse of virgin territory surrounding them. In 1815 a gratifying yield of wheat was obtained from the little areas sown, enough, it is said, to provide for the wants of the few hundred settlers during the following winter. This marked the beginning of wheat-growing in Manitoba, an industry that has made the province known throughout the entire world and the introduction of a cereal that has become famous in every civilized land—"Manitoba hard." The first export of wheat was made in 1876, when 857 bushels were shipped from Winnipeg to Toronto to be sold for seed as No. 1 Hard. In 1915, one hundred years after the first little crop was harvested by hand, the golden fields of Manitoba yielded nearly ninety-seven million bushels of this cereal alone, besides great quantities of other grains and farm products.

Grain-Growing Exclusively.—Agriculture in Manitoba has passed through many stages of development and is becoming more scientific, more stable, and more intensified from year to year. When the long years of tedious pioneering were followed by a more prosperous period, grain-growing was followed exclusively for a time. The ease with which the prairie could be made ready for the seed, the fertility of the soil, the rapidity of vegetable growth and the abundant yields gave rise to a state of affairs in which the zeal for grain

production obscured all other phases of agriculture. Manitoba wheat, of which No. 1 Hard and No. 1 Northern are the world's highest grades, became the emblem of the country's ambition.

Then followed a period when it became evident that Manitoba was not designed to be merely the greatest harvest field of the Empire. The importance of Winnipeg as a commercial and industrial metropolis of the western plains

CANADA'S BREAD SUPPLY

The home of Manitoba No. 1 hard wheat, which is in great demand in the United States and Europe.

indicated that other than agricultural interests were to play an important part in the development of the province. The discovery of extensive mineral deposits within her borders, the development of great water-powers, the attention directed to the possibilities of commercial forestry, and the importance attached to the utilization of these and other resources overshadowed for a time agricultural activities. The grain belt steadily spread west also, and in 1915 the adjacent new province of Saskatchewan, produced a wheat crop three times the bulk of Manitoba's. As a grain-growing province Manitoba has no peer for quality, though in quantities it is now surpassed by both Saskatchewan and Alberta.

Mixed Farming.—It is not in the production of grain alone, however, that Manitoba farmers are destined to retain their position of prominence. The broadening out of the industry to embrace every phase of rural development is now in progress and the success that is being attained is as remarkable as that which favoured the growing of wheat alone. It speaks well for the permanency of the industry that such is the case. Mixed farming is proving an unqualified

success. The raising of live stock, the prosecution of dairying, the keeping of poultry and bees, the growing of vegetables and, more recently, of fruits are branches of the calling firmly established. The successful development and expansion of the varied commercial and industrial enterprises of the province depend largely on the ability of the farm to produce a wide range of the necessities of life and on such development and expansion the farm depends for its permanency. The successful establishment of a many-sided form of agriculture in Manitoba has given the opportunity for the fullest development of the industry with resulting enhanced prosperity.

Difficulties Encountered.—Agriculture has not attained its enviable prominence in Manitoba without a struggle, or rather a continuous series of struggles. Difficulties and setbacks, some of which at times seemed to threaten the very existence of the industry, have been encountered in many forms and on many occasions. The early settlers lost entire crops by the devastations of plagues of grasshoppers. On one occasion the Red river overflowed its banks and drowned out their grain. Summer frosts have taken toll of many immature crops. Enemies in the forms of gophers, crows and other lesser forms of animal life harassed the tender growing grains, while hail, frosts and rust made their maturing periods full of uncertainty. Weeds have found the fertile soil very much to their liking and cut-worms have sometimes been destructive to the vegetable garden.

Stock-raising was beset with corresponding obstacles. Alkali water, poison wild plants, clouds of insects and unusual climatic conditions played havoc with much of the live stock first introduced. We are told that it was considered necessary that imported horses should become acclimatized before they could be put steadily to work and that in the process a large percentage died. Wolves, coyotes and birds of prey made the raising of sheep or poultry almost impossible. Added to all these handicaps were general pioneer conditions in which the settler had to contend with lack of roads, distance from market, difficulty of obtaining and high cost of building material, scarcity of labour, and even personal hardships and privation.

Pioneer conditions also prevented the farmer from marshalling up the varied potential resources that lay within his power. Under stress of breaking land, erecting buildings and fences, digging wells and carrying out the endless tasks incidental to converting a piece of "wild" land into a home and a farm, he was forced to forego many of the activities that more leisure time would permit. Hence, it should not be wondered at that he found it to his advantage to buy many items even of food that should have been produced on his own land. Three main causes are responsible for the delay in rounding out agriculture in Manitoba to its widest scope. The first was pioneer conditions, which encouraged and even forced the settler to adopt the course which gave the quickest returns with the least outlay of time or capital, that of straight grain-growing. The second was the lack of knowledge of the possibilities of more diversified and intensified forms of farming. The third was the absence of ample markets within reach of the farm for such varied farm products, and the lack of creameries, cold storage plants and refrigerator cars.

Improved Conditions.—Improved conditions are due principally to two factors. One is the so-called change of climate. That the climate has actually changed or moderated is a much disputed question but local conditions have certainly been improved by the breaking up of the prairie sod, the draining of

low, wet areas and the planting of shelter trees on open sections. Danger to growing or ripening crops from late spring or early fall frosts is restricted to outlying sections, and, whatever the reason that makes it possible, tender vegetables, corn and fruits are being successfully raised where years ago it was considered hazardous to attempt even the hardiest grains. But if nature has been kind, man has also done his part. Seeds have been propagated that have revolutionized grain growing. By developing species that grow more rapidly and ripen more quickly, the dangers from early fall frosts have been largely eliminated and the grain belt has been vastly extended.

The overcoming by scientific means of such obstacles peculiar to Manitoba has not been restricted to grain. In every branch of agriculture, horticulture and live-stock raising science has been applied with equal success. The Departments of Agriculture of both Federal and Provincial Governments have done herculean work in making possible rural conditions that put Manitoba in the front rank of the all-round agricultural countries of the world. Through the Manitoba College of Agriculture and its Extension Service, of which more information will be found on following pages, demonstration farms and series of educational lectures and reports, the problems of the day are being met and solved. The era of scientific farming is just dawning and the future in Manitoba is exceptionally promising.

Improved home conditions are equally important factors in guaranteeing the success of the farm. In too many cases farm life lost its incentive through uncongenial living conditions. A network of railways and improved rural highways has eliminated the disadvantage of distance to a great extent. The advent of the telephone keeps the farm in touch with current markets and the news of the day. The introduction of the automobile still further adds to the advantages of the farm. With the many social and economic advantages of the farm of to-day, and the unexcelled opportunities it offers, there is no more promising way in which an enviable home and a thriving business can be obtained. Agriculture must remain the fundamental industry of Manitoba and the one offering the best inducement to those of limited means seeking a home and livelihood.

Grain-Growing

Grain-growing in Manitoba has been the principal branch of agriculture for fifty years and, even with the introduction of mixed farming, must continue the mainstay of the farm. Some of the distinctive characteristics that added a romantic glamour to its earlier days, however, are disappearing before the more modern systems of scientific agriculture. Like the pioneer life of the backwoods or the cowboy days of the unfenced ranches, the strictly "wheat-farming" era of Manitoba is losing its individuality, though the actual production of this grain is on the increase.

A Vista of Wheat Fields.—The grain-growing plains of Manitoba provided an inspiring sight. Farm after farm stretched away in every direction as far as the eye could see. A quarter-section farm is one-half mile square; a half-section, which is a favourite farm area in the West, measures half a mile in width by a mile in length, while a section makes a farm that measures a mile on each side. As the exclusive grain-growers kept but little live stock, other than the horses required for the purpose of farm work, these extensive farms remained unfenced, save for small enclosures about the stables. This custom

strikes the arrival from older countries as perhaps the most strange of all, since he is accustomed to seeing even much smaller farms subdivided and fenced in numerous little fields.

Another distinctive feature of the Manitoba grain farms is the lack of huge barns and their accompanying array of lesser buildings usually associated with visions of farmsteads. The grain-grower in Manitoba required only shelter for himself and stabling for his horses. Contrary to methods followed in older countries, the grain is not garnered into barns but when ripe and cut is threshed in the open field.

Since on the prairies, building material was exceedingly scarce, the pioneers were compelled to be content with the most modest houses. Picture, therefore, a boundless expanse of level prairie country, checkered off into holdings ranging from a half mile to a mile square, each being distinguishable on this great picture by a couple of little dots signifying its miniature buildings. No fences, orchards, or other marks of older civilization broke the monotony of this flat view. The country roads, which were but trails, ran like lanes through the waving fields of grain. With the least physical alteration to the landscape that one could conceive possible, the prairies had been clothed with a mantle of golden grain in place of their natural verdure.

Distinctive Features.—Grain-growing on these extensive prairie farms has its own distinctive phases, the most striking of which is the magnitude of

PREPARING FOR THE CROP

Motor tractors are used for ploughing and discing the land where large areas are cultivated.

the scale of operations. The farmer drives a team, not of two horses, but of four, five, six or even more. These have been replaced in many instances by mechanical power of even greater capacity. Farm implements used are on a scale correspondingly large. The level surface of the ground, the extensive areas of the farms and the ease with which the soil can be cultivated, permitted all these large-scale methods of operation. The work of the grain-grower was crowded into two busy seasons, seeding in springtime and harvesting and threshing in the fall. As soon as the snow had disappeared from the ground and the surface dried sufficiently, which in Manitoba takes but a short period, the

farmer rushed his seeding operations from daylight till dark. The loose, rich soil of the prairies requires but little cultivation to make it ready for the seeding and a single man with his extensive equipment was able to put huge areas under crop in a few weeks' time.

Harvesting Scenes.—The grain then received no further attention until it was ready to be harvested. Harvesting operations made more help necessary, hence were inaugurated the famous harvest excursions which railways ran from the older and more thickly settled portions of Eastern Canada. Many a resident of Manitoba first visited these western wheat fields as a harvest excursionist. Four-horse binders of eight-foot cut flashed their reels over the great expanses of golden grain and from sunrise till sunset circled round and round the steadily

THRESHING ON PORTAGE PLAINS, MANITOBA

Owing to the magnitude of operations, the grain in Western Canada is threshed in the field.

diminishing field. A ball of twine disappeared in a single circuit. Miles of sheaves lay waiting the stookers whose duty it was to stand them erect in little sets making the familiar stooks.

Threshing.—After a few days drying in the stook, if the weather was favourable, the grain was ready to be threshed. This grain, as has been stated, was not gathered into barns as in Eastern Canada. Its very bulk made the providing of such shelter impossible, and, furthermore, time would not permit of such methods. The sheaves might be gathered and built into little sets of round or conical-shaped stacks at convenient spots. Usually four stacks were built to a set, each at the corner of a square, allowing the threshing machine to be set between them in such manner that a fair wind would always be insured.

The more common method, however, was to thresh direct from the stook. Huge threshing outfits steamed in among the stooks and settled down to business with alacrity. The threshing gang gathered the sheaves on wagons and drove them to the machine where they were devoured with astonishing rapidity.

Other teams drew the grain directly from the machine to the nearest elevator. As soon as the land within easy reach was stripped, the threshing outfit moved on, leaving behind it a huge pile of straw which its blower had unceremoniously heaped up. Long after twilight the roar of the machine and the shouts of the thresher could be heard, for every moment of time was precious while favourable weather held. The midnight sky then became lurid with reflections of fires far and wide as the freshly threshed piles of straw, now no longer useful to the exclusive grain-grower were burnt.

Changing Methods.—Much of the romance and picturesqueness of the operations of the exclusive grain-grower are disappearing. Fields are being fenced in, larger and better buildings erected, roads graded, telephone lines strung, smaller gasolene outfits are replacing the huge straw-burning steam outfits, and with the introduction of more and more mixed-farming the loose and wasteful methods so often prevailing are giving way to more thorough ones.

Grades of Wheat.—Winnipeg is the central market and clearing-house for all grain grown in Western Canada and here the successive years' yields are graded by government experts and marketed on the basis of such examinations. The grade par excellence is known as No. 1 Manitoba Hard, the flour of which is eagerly sought by every fastidious baker or pastry cook. This grade called for at least 75 per cent of hard Red Fife or Marquis wheat. It is comparatively rare and the standard grade is now known as No. 1 Northern which calls for a content of 60 per cent hard Red Fife or Marquis. Other commercial grades are fixed according to the qualities of the various varieties of wheat offered or the condition in which it has matured and been gathered. Oats, barley and other grains are graded in like manner.

Some Record Crops.—The heaviest yield of wheat to the acre was secured in 1876 with a record crop of 32·5 bushels to the acre. Part of this crop constituted the first export of Manitoba wheat. The greatest quantity harvested in Manitoba in any one year was the crop of 1915 which totalled nearly ninety-seven million bushels and averaged 26·4 bushels to the acre. Almost the entire wheat crop of Manitoba consists of varieties of the hard red spring wheat class, though about one per cent is made up of fall or winter wheat.

Oats.—Second in importance may be considered the oat crop. Oats have a greater yield in bulk per acre than wheat. Especially in the northern part, under certain conditions they mature to better advantage; and the straw makes valuable fodder. The greatest yield in Manitoba both in quantity and yield per acre, occurred in 1915 when one hundred and one million bushels were secured from 2,121,845 acres, an average of 47·7 bushels to the acre.

Barley.—Barley has also become a staple grain crop of Manitoba, though during the last few years its production has fallen off. The best years were those of 1912, 1913 and 1915. In 1912 the average yield was 35·1 bushels to the acre. In 1915 the average was somewhat lower, though showing an enviable figure of 34 and the increased area under crop resulted in a total yield of over thirty-five million bushels.

Flax.—Flax has been successfully grown for many years and there are excellent opportunities for the establishment of industries utilizing this product. The attention given to the crop has been more or less spasmodic. In 1911 an average yield of 14 bushels to the acre was secured. The following year over double the area was sown and the yield was nearly as good, 13·6 bushels. The total yield in 1912 was over two and one half million bushels, a figure that has not since been reached.

Rye.—Rye, both fall and spring varieties, is steadily increasing in popularity as a grain crop and is giving excellent results. The crops of 1918 and 1919 each yielded around the four million bushel mark. The averages for these years were about 16 and 14 bushels to the acre, respectively. The growing of field peas has been undertaken more recently but is gaining in favour, about 11,000 acres being devoted to this crop in 1921.

Acreage and Yield.—Particulars of the acreages under field crops, average and total yields, and averages prices and total values are shown on following pages in tabular and chart forms for each season during the ten-year period 1912 to 1921. It will be noticed that the year 1915 was an exceptionally favourable one as regards yields, while in the year 1919 prices had reached a war peak. Under the heading "Wheat" both fall and spring varieties are included. The proportion of fall wheat grown is very small and since 1918 it has become practically negligible.

FIELD CROPS IN MANITOBA, 1912-1921

I. Wheat

Year	Acreage	Yield per acre	Total Yield	Average price per acre	Total Value
				$	$
1912	2,823,362	20·7	58,433,579	0·67	39,150,500
1913	3,141,218	20·0	62,755,455	0·71	44,556,400
1914	3,366,200	15·5	52,491,879	1·01	53,016,800
1915	3,664,281	26·4	96,662,912	0·90	86,996,600
1916	2,994,529	10·2	30,439,600	1·23	37,440,700
1917	2,853,362	14·9	42,689,061	2·05	87,512,600
1918	2,917,384	16·5	48,142,062	2·06	99,172,600
1919	2,862,383	14·3	40,975,280	2·40	98,340,700
1920	2,687,500	14·0	37,542,000	1·83	68,701,900
1921	3,384,700	11·5	39,053,980	0·91	35,539,100

II. Oats

1912	1,939,982	46·0	87,109,677	0·28	24,413,400
1913	1,939,723	42·0	81,410,174	0·28	22,794,800
1914	2,064,114	30·0	62,034,668	0·48	29,776,600
1915	2,121,845	47·7	101,077,991	0·35	35,377,300
1916	2,062,411	32·8	67,729,922	0·49	33,187,700
1917	2,230,005	28·4	63,372,832	0·67	42,459,800
1918	1,694,072	32·1	54,473,483	0·71	38,676,200
1919	1,826,366	31·6	57,698,014	0·72	41,542,600
1920	1,855,000	31·1	57,657,000	0·56	32,287,900
1921	2,136,900	23·1	49,442,500	0·30	14,832,800

III. Barley

1912	962,928	35·1	33,795,191	0·37	12,504,200
1913	1,153,834	28·6	33,014,693	0·34	11,225,000
1914	1,187,136	20·0	23,866,098	0·55	13,126,400
1915	1,039,849	34·0	35,423,495	0·51	18,066,000
1916	1,153,660	20·9	24,116,141	0·80	19,292,900
1917	1,270,724	20·4	26,014,948	1·07	27,836,000
1918	1,093,129	25·5	27,963,390	0·89	24,887,400
1919	855,048	20·1	17,149,425	1·17	20,064,800
1920	831,000	21·1	17,520,000	0·80	14,016,000
1921	1,012,750	19·4	19,681,645	0·43	8,463,100

FIELD CROPS IN MANITOBA, 1912-1921—*Concluded*

IV. Flax

Year	Acreage	Yield per acre	Total Yield	Average price per acre	Total Yield
				$	$
1912	196,315	13·6	2,671,729	1·04	2,778,600
1913	115,054	11·3	1,301,278	1·05	1,366,300
1914	100,191	10·0	1,001,910	1·10	1,102,100
1915	64,863	11·4	739,808	1·61	1,191,100
1916	55,608	10·5	587,635	2·13	1,251,700
1917	63,605	8·6	552 309	2·85	1,574,100
1918	106,635	10·2	1,090,994	3·15	3,436,600
1919	55,679	9·3	520,303	4·26	2,216,500
1920	143,965	8·0	1,157 800	2·25	2,605,100
1921	59,931	9·1	554,675	1·50	832,000

Specialized Farming.—This highly specialized grain-growing form of farming brought about an especially acute condition of affairs not experienced to so marked a degree in ordinary farming countries, namely, an avalanche of grain upon the railways and markets in the fall threshing season. "Mixed" farmers feed varying proportions of their crops, in many cases the entire production. In older countries, where the sheaves are gathered into barns, threshing operations may be delayed till a more convenient season and even then with granary accommodation the grain may be stored and marketed more leisurely. But the exclusive grain-grower operates on an extensive scale that compels him to haul a large percentage of his threshed product direct from the field to his marketing or shipping point. Hence to take care of these great crops an extensive elevator and shipping system has sprung up.

Grain Elevators.—The following brief tabular statement of elevator statistics in Manitoba will serve to illustrate the magnitude of the grain-growing business. All Manitoba's export grain is shipped east by rail to Fort William and Port Arthur, and from thence by boat on the Great Lakes. Further information of the grain export business will be found in the section entitled "The Grain Business" in Chapter X.

ELEVATORS IN MANITOBA, 1921

Kind of Elevators	Stations	Elevators	Capacity
			bush.
Country	380	690	22,073,600
Interior public terminal	2	2	2,000,000
Interior private terminal	3	4	300,000
Total	385	696	24,373,000

GRAIN LOADING PLATFORMS, 1921

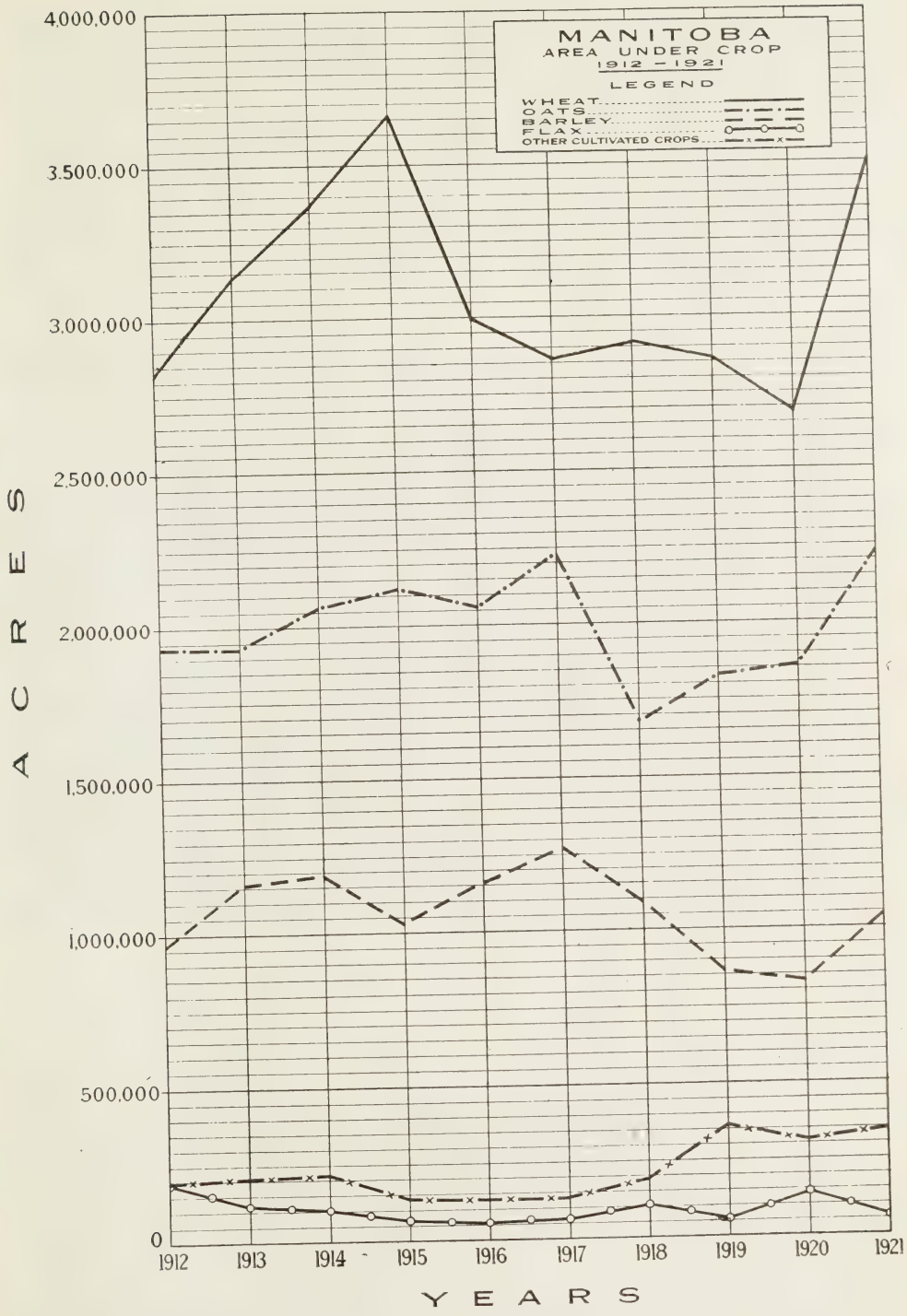
Railway	Number of Platforms	Capacity
		cars
Canadian Pacific	244	603
Canadian Northern	273	634
Grand Trunk Pacific	36	78
Great Northern	14	42
Brandon, S. and H.	12	37
Total	579	1,394

Improved Varieties.—No account of grain-growing in Manitoba would be complete without reference to the fascinating story of the introduction of new and improved varieties of cereals and the enhanced success of the industry resulting therefrom. From time to time new seeds have been imported or propagated, which, by virtue of special qualities possessed, have proved more suitable to prevailing conditions, thus resulting in widening the area of production and giving more abundant yields and improved quality. The original varieties of wheat grown in Manitoba early gave way to the famous Red Fife, which for many years was king of all spring wheats. It derives its name from the colour of its ripe grains, which is quite reddish, and the name of an Ontario farmer, Donald Fife, who introduced it from Europe about the year 1841. It reached the Middle States about 1860 and Manitoba about 1870.

Story of Marquis Wheat.—The story of the wonderful Marquis spring wheat is of paramount interest, especially to Canadians. Discovered and introduced by Dr. Charles E. Saunders, Dominion Cerealist, Ottawa, it has spread with an astonishing rapidity over Western America and has attained the highest rank among spring wheats. Commencing with a few grains planted in a tiny plot at the Experimental Farm, Ottawa, in the spring of 1904, Marquis produced a crop that year weighing less than a pound. The estimated value of this wheat produced in 1918 was $600,000,000.

Marquis possesses several qualities that make it especially attractive to the western grain-grower. It matures quickly and ripens early, thus reducing the risks from frost and rust and extending the belt in which wheat may be successfully grown. It is resistant to shelling and stands up well under storms. At the same time, it is an exceptionally heavy yielder and its milling qualities are unsurpassed. The gain to farmers in particular, and the world in general, that has resulted from the introduction of this variety can be estimated in millions of dollars.

The story of Marquis wheat is vividly told by Dr. Buller, Professor of Botany at the University of Manitoba, in his admirable book *Essays on Wheat*. Many other varieties of wheat of special qualities have been introduced, including Ruby, Prelude, Red Bobs, Kitchener, and others. Barley, oats and other cereals have been similarly experimented with and improved. Among the many new varieties might be mentioned a hulless oat, propagated at the Experimental Farm, Ottawa, and named, "Liberty Ottawa". The introduction of improved strains of cereals having qualities especially adapted to prevailing conditions in Manitoba has been a most important factor in the development and success of grain-growing.


MANITOBA
AREA UNDER CROP
1912 – 1921
LEGEND
WHEAT
OATS
BARLEY
FLAX
OTHER CULTIVATED CROPS
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
ACRES
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
YEARS

Stock Raising*

With the establishment of ample markets and a better knowledge of the opportunities for the successful prosecution of stock-raising in Manitoba, greater numbers of farmers are yearly turning their attention to this phase of agriculture, either as a side line or a specialty. The general tendency towards mixed farming has a two-fold objective. It creates a greater stability in the operation and revenue of the farm, distributing the risks and ventures as well as the labour more evenly throughout the year and giving a greater latitude in marketing. It also guarantees the upkeep and improvement of the condition of the farm, preventing the impoverishment of the soil, controlling the weed evil and utilizing hilly, stony or other areas not suitable for grain-growing.

Chief among the advantageous conditions in Manitoba may be mentioned a favourable climate, cheap land, plentiful and cheap feed because of the heavy yield on cheap land, plentiful native pasturage and wild hays of high food values, abundance of good pure water, an ample market, plenty of railways and excellent shipping facilities and a remarkable freedom from animal diseases.

Cattle.—Contrary to general belief the climate of Manitoba does not prohibit the running at large of cattle during the winter months. Many of the most successful stock breeders testify to the wintering out of both horses and cattle with satisfactory results. Shelter is required only when occasional high winds and driving snow prevail. Natural bluffs of trees, cultivated windbreaks or open sheds will give the necessary shelter. The dryness of the air and the exceptional amount of sunshine are chiefly responsible for this condition. The cattle do not get wet with melting snow as in the corn belts to the south and consequently do not mind the colder, but drier, temperature. Nature also provides a thicker coat of hair.

Wintering Outdoors.—Live stock thus wintered out, however, require feeding as, on account of the snowfall, only in exceptional cases, can forage be found. On farms where grain has been threshed cattle will winter around the straw piles and, if given a little grain in addition and provided with plenty of water, will come through in good condition. At the Government Experimental Farm at Brandon, tests were made over a period of five years. The cattle were outdoors all winter, running over a southern slope in a clearing made in a thick bluff. Careful record was kept of each animal, and the results are conclusive. In the five winters the average weight of the cattle in the fall was 1,027 pounds at the commencement of the feeding period. The average feeding period was 156 days, and the average gain per animal was 1·21 pounds per day, the average weight at the end of the period being 1,217 pounds. During this period of five years the average spring selling price was more than double the fall buying price, and, making full allowance for the value of the feed, there was a handsome profit every year. The principal feed was ordinary threshed straw with a little chopped grain, mainly oats and barley.

Cattle breeders in Manitoba state from experiences ranging over many years that the native grasses provide pasturage for as many months each year as the blue grass pastures of Iowa and Illinois. As a rule, cattle range from the middle of April to the middle of November without extra feeding, a period of seven months. This leaves an average winter feeding period of five months, during which time they are also out-of-doors. In this connection two very important facts are worthy of consideration; first, that the land itself can be procured now at exceptionally low prices compared with that in older-settled sections, and second, that fodder of every variety can be grown in great abundance. The absence of droughts and the fertility of the soil guarantee this.

* Compiled principally from information supplied by the Department of Agriculture, Winnipeg.

Forage Plants.—Wild forage plants of many kinds abound. These possess uncommon natural fattening qualities, and cattle grazing on them require much less "finishing" than would otherwise be necessary. This is one of the most important of the natural advantages that go to make Manitoba so well adapted for raising live stock.

Kentucky blue grass grows in profusion, and here, as in its native state, it is worthy of the name of the king of pasture grasses. A near relative, known as Canadian blue grass, is also to be found almost everywhere. Knot root grass, wild timothy and the well-known red top also grow in profusion, as well as the slender wheat grass now commonly known in Manitoba as Western rye grass. There is in addition, the Western wheat grass, commonly known as blue-joint, a plant of unusual hardiness.

HARVESTING SUNFLOWERS

With the growth of the live-stock industry the growth of sunflowers for ensilage is increasing. Some of these stalks were 16 feet in height.

Wild Grasses.—For hay purposes for winter feeding, wild grasses are abundant in all parts of the province, and furnish the whole hay crop for thousands of Manitoba farmers. Western rye grass is probably the best of these, and grows to perfection under almost any conditions. This grass, sown alone, has yielded at the rate of 6,800 pounds to the acre. Under cultivation it grows easily and quickly, seeds readily, matures quickly and cures perfectly. Another advantage, it that it is easily eradicated from land required for other purposes. So adaptable to cultivation has it shown itself, that it is now one of the most generally cultivated grasses. Because of its wonderful qualities of heavy growth, hardiness and food value, it is a favourite hay grass. Among the other cultivated grasses which are giving fine satisfaction in Manitoba are timothy, awnless brome grass and red top, meadow fescue and tall oat grass.

The Clovers.—Apart from the native and cultivated grasses, the clovers and other leguminous plants have proved their adaptability to conditions in Manitoba. In the past few years alfalfa has been successfully established. It has been proved in most parts of the province that the soil is particularly adapted to it. Experiments at Brandon have shown an average crop of over five tons to the acre, and farmers from all over the province testify to the success they have had with it. While alfalfa is fast becoming the most popular of the leguminous plants, broad red clover and alsike are also much grown, and like every other fodder, yield well. Broad red clover has been grown for many years and hardy strains have been developed that insure a crop even under adverse conditions.

The abnormally fast growth in Manitoba makes it easy to raise summer forage, either for pasture or for hay. Late sown oats or mixed oats and peas are the most commonly grown and the most easily handled, and winter rye is also largely grown for early spring feed. For summer catch crops, the millets thrive wonderfully and yield heavy crops.

Silage Crops.—For the silo, which is being used more and more by Manitoba farmers, corn grows well, particularly in the south and in the lower altitudes. Although the seasons are not as long as in the Western States, the growth is fast and many Manitoba farmers are proving it can be successfully raised. It has recently been demonstrated that sunflowers, stupendous crops of which can be grown without the least difficulty, make excellent ensilage of high food values.

The large crops of oats and barley that can be grown on Manitoba land, form one of the great natural advantages of the province for the raising of beef cattle and fed stock of every kind, as well as for dairying. A mixture of oats, barley and alfalfa makes an ideal feed which is very popular, and is fed by many of the most successful farmers in the province.

Oats Flourish.—Manitoba oats have a feeding value superior to oats grown almost anywhere else, mainly because of their exceedingly light hull and plumpness of kernel. They weigh more to the measured bushel than oats grown in any of the States. Their average weight is 38 pounds to the bushel and oats weighing 40 pounds and over are not uncommon. In the Middle Western States the average weight of oats is from 30 to 34 pounds. The difference in feeding value will be readily understood by any practical farmer or stock man. What has just been said of oats is equally true of barley. Manitoba barley is very light hulled, weighs very heavy, and analysis show it to contain food values that can hardly be equalled anywhere else.

It has been thoroughly demonstrated that corn is not necessary to finish first-class beef cattle. At the International Live Stock Show at Chicago in 1912, and again in 1913, J. D. McGregor, of Brandon, won the grand championship with steers that had never tasted corn. Their principal diet was Manitoba barley and oat chop, turnips, and oat straw, natural prairie hay and a very little linseed meal. Manitoba beef cattle have on various occasions since maintained their right to rank with the best. The success with which they can be raised, the undisputed quality of the finished product and the profits that reward enterprising stockmen specializing in this branch of agriculture have assured the future of the beef industry of Manitoba.

Horses.—The success of horse-raising in Manitoba is also an assured fact, and the industry is on a sound and progressive footing. The Provincial Government, through its Department of Agriculture, has led the way in enacting legislation for the general welfare of the horse. It requires the enrolment of all stallions, and their classification by a staff of veterinary surgeons. A direct

check is therefore placed at the outset on the raising of inferior and scrub progeny.

Extensive importations of the best breeding stock available have been made from Europe and the United States, and the check on disease has been practically complete.

Both soil and climatic conditions are admirably suited for the undertaking. The contour of the country is such as to enable colts to reach maturity without developing unsoundness, which is so prevalent in more hilly countries. The abundance of pasture and feed of every description suitable for horse feed which can be grown in Manitoba brings the cost of production down to a lower level than in older settled countries. While the winters are somewhat severe, the atmosphere being dry and the cold not so keenly felt as in more humid areas, there are thousands of horses wintered annually out of doors, and these come through in surprisingly good condition.

While the small tractor is becoming popular in Manitoba, the general trend of farming toward a more intensified and diversified system calls for crop rotation, smaller fields, and the need for fencing; there is also a consequent tendency towards smaller farms. This condition will naturally make it more difficult to utilize the tractor, and will make horse power still more popular than at present.

According to provincial estimates there were some 400,000 horses in Manitoba in 1921. Of these the favourite type was the general purpose, Clydesdales and Percherons being in the lead.

Swine.—Swine-raising in Manitoba has been found to be a profitable industry. The country is particularly well adapted to it, the climate is agreeable and actual experience proves that the winters present no real difficulties. Cheap land, abundance of feed and a good open market are big factors, while the almost total absence of hog diseases is an important consideration. Owing to scarcity of help and higher prices of feed prevailing in the last few years, many farmers have not raised so many hogs, but those who give the industry more than passing attention, either as a side line or as their chief business, have found that it gives excellent returns.

Manitoba farmers who have been successful in hog-raising favour field feeding. The advantage of this is that it reduces the cost of the finished pork from 20 to 30 per cent. Alfalfa, as every swine breeder knows, is an ideal pasture crop and stands pasturing better than the clovers. It grows to perfection in Manitoba, the hardy varieties grown to suit the climate having proved to be of exceptional food value. It has been proved that pigs put out on pasture with a small allowance of grain grow rapidly and make very cheap gains.

Manitoba wheat screenings have proved to be good swine feed and are commonly used for this purpose. Actual tests have shown an average daily gain of 1·39 pounds on wheat feed as against 1·29 pounds on corn alone. One bushel of wheat put on an average of 13·7 pounds of pork as against 12·3 pounds produced by a bushel of corn.

Reports from several of the United States indicate that barley is becoming a popular swine food and compares favourably with corn. In Manitoba, where barley grows exceptionally well, both in the volume of crop and the weight and quality of the grain, it has been found to produce an uncommonly fine quality of pork which always commands the top market price. Almost all Manitoba hogs are fattened on barley.

For the man who goes in for mixed farming in Manitoba, and more and more Manitoba farmers are doing this every year, a reasonable number of hogs, without doubt, are among the best moneymakers.

Sheep.—Sheep-raising is another branch of the live stock industry that can hardly be said to be more than in its infancy in Manitoba, but that it has a great future, is the belief of everyone who has made a study of its possibilities. The number of sheep in the province is increasing rapidly. Men who have given sheep-raising a fair trial are, without exception, increasing the size of their flocks and hundreds who have watched the success of their neighbours with sheep are following their example. The result is that the amount of wool marketed in Manitoba is steadily increasing.

There were two main reasons why Manitoba farmers did not take to sheep-raising earlier in the farming history of the province. One was that the unexampled success with grain crops kept most of them to that one line. The other was that in the earlier days of the country, coyotes were plentiful and did much damage. To-day the danger from coyotes is much less, and farmers are realizing that there is profit in wool and mutton. In fact there are hundreds of Manitoba farmers who declare that the sheep is the biggest money-making animal on the farm.

Sheep are at their very best in a country like Manitoba where there is such an abundance of natural forage. In a grain country like Western Canada there is always a large supply of screenings available at low cost. Some breeders feed almost exclusively on screenings, figuring usually on about one hundred days of feeding before marketing.

The market for lamb and mutton is a top market in Manitoba at all times. The sheep breeder thus finds the raising of lambs a money-making industry because of the quick return in cash with a minimum of work and feeding. As yet, there are not sufficient sheep raised in the province to supply the local demand.

Stockyards.—The St. Boniface Stockyards are the live stock centre for Western Canada. These stockyards, some two miles distant from Winnipeg,

STOCK YARDS AT ST. BONIFACE, MANITOBA
Canada's largest stock yards, with over one thousand pens, accommodating twenty thousand animals.

bear the same relation to the live stock industry of the Canadian West as the stockyards at Chicago bear to the Western States. From a marketing point of view these yards are exceptionally favourable. They were constructed by the three Canadian railways; the Canadian Pacific, the Canadian National, and the Grand Trunk Pacific, who each own one-third interest in them. They provide an absolutely free and open market where the farmer has every opportunity to market his live stock under the most favourable conditions. Each of the three railways has direct access to the yards, which are so located as to be within a very short distance of the Winnipeg terminals of those railways, thus minimizing all chances of delay in live stock reaching the market. They were first opened for business as recently as 1913. In constructing them the railway companies, who are doing their utmost to encourage the live stock industry, had their engineers visit the large live stock markets in the United States, and features have been introduced in the construction which make these yards the most modern and sanitary on the continent. They now cover about 60 acres, and have a capacity which will take care of about 10,000 head of cattle, 10,000 hogs and 4,000 sheep at one time. They are the largest in Canada and represent an investment of about a million dollars.

Winnipeg is therefore the live stock market for Western Canada cattle. Prices are ruled to a certain extent by the St. Paul and Chicago markets. A shipper always has the option of selling at Winnipeg or shipping through to St. Paul or Chicago. Freight from Winnipeg to Chicago is little more than from Western Nebraska to Chicago. The Winnipeg market however, is usually high enough to get the majority of the cattle. Receipts during the past ten years are shown below.

RECEIPTS OF LIVE STOCK, WINNIPEG STOCK YARDS, 1912-1921

Year	Cattle	Hogs
1912	101,044	110,781
1913	111,163	179,830
1914	110,452	461,889
1915	138,534	484,997
1916	158,949	317,821
1917	286,651	372,168
1918	320,207	362,675
1919	367,944	268,628
1920	347,247	145,969
1921	212,265	124,493
Ten-year total	2,154,456	2,829,251

The Manitoba Government has co-operated with all interests in facilitating the production and handling of live stock; and with the low-priced farm lands available, the institution of excellent financial arrangements by the Government in arranging for loans to be made to the farmers, at low rates of interest to enable them to purchase live stock, and the favourable marketing conditions at the stockyards, the province of Manitoba offers unexcelled opportunities for success in live stock raising.

Dairying.—During the past ten years the dairy industry has become firmly established as a permanent branch of agriculture in Manitoba. Until 1915 Manitoba was importing creamery butter. In that year she exported fifty carloads, valued at $324,800. This achievement may be accepted as marking the

turning point in the industry and the beginning of an active era of development. Though dairying is still in its infancy, it has made such rapid and healthy growth as to insure its success.

The Dairy Act.—In order that the industry might have its foundations laid on a wise and permanent basis, the Provincial Government in 1915 introduced the Dairy Act, which aims to assist and encourage the producer as well as to protect the consumer. Part I of the Act deals with the incorporation of creameries and cheese factories, requiring government approval of the sites and plans and prescribing certain regulations for the transaction of business. Part II deals with sanitation and operation. It stipulates that every creamery or cheese factory must be licensed, provides for their inspection and empowers officials to close any factory found operating under unsatisfactory conditions. The Act also provides for the grading and branding of all dairy products by government inspectors.

The Dairy Branch.—Still further to insure the success of dairying and to keep pace with its rapid growth, the Provincial Government in 1917 established the Dairy Branch of its Department of Agriculture for the specific purpose of assisting and encouraging the industry and guiding its rapid growth along permanent and staple lines. The work of this Branch consists of: (*a*) Administration of the Dairy Act. (*b*) Assisting in organizing and establishing new creameries and cheese factories. (*c*) Inspection of creameries and cheese factories by qualified instructors and inspectors, and assisting and advising cheese and buttermakers regarding the most up-to-date methods of manufacture. (*d*) The regulation, inspection, and licensing of all cream-buying stations, as well as the examination and regulation of operators; also the licensing of cheese and buttermakers. (*e*) Assisting in arranging provincial and interprovincial competitions among the manufacturers of dairy products, for the purpose of standardization. (*f*) Developing the dairy industry by the holding of meetings, as well as by issuing bulletins, reports and other educational literature, and placing pure-bred dairy sires wherever possible. (*g*) Grading of creamery butter manufactured in the province, and the issuing of certificates regarding its quality, as well as assisting in marketing when requested. (*h*) Research in dairying.

Butter is Graded.—Through the grading system it has been possible to standardize creamery butter and to place on the market uniform grades, which are so essential in building up and meeting the requirements of the trade both at home and abroad. Manitoba creamery butter is now recognized as the equal of any creamery butter produced on the continent, and has commanded top prices wherever offered.

Largely through the efforts of the Dairy Branch, Manitoba creamery operators some years ago adopted a system of grading the cream as received from farmers. There are three grades with a difference of three cents per pound for butter fat between grades 1 and 2, and two cents between grades 2 and 3. The result has been that the average quality of the cream coming from the farmers has been greatly improved with a consequent increase in the returns to the farmer and a very large increase in the production of the highest grade of butter.

At the Canadian National Exhibition, Toronto, Manitoba creamery butter in competition with all Canada, has won for two years in succession the championship cup for highest-scoring butter shown. Among the many notable records made by Manitoba-bred cows might be mentioned that of a pure-bred 2,000-pound Holstein in a herd near Winnipeg. In 1916 she produced 20,502 pounds of milk and about 844 pounds of butter.

In general terms the same factors which favour the raising of live stock apply with equal force to the dairy industry. Abundance of feed, both in summer pasturage and for winter use, favourable climatic conditions, plenty of pure

water, freedom from diseases, ample and profitable markets, adequate shipping facilities and a live, sympathetic and encouraging attitude of Government officials together with a spirit of co-operation among all concerned, are factors that are making dairying in Manitoba advance by leaps and bounds. Some of the drawbacks that dairymen have had to contend against include scarcity of efficient help, high cost of foodstuffs, pests of flies and in certain southern sections unusually dry weather. Owing to scarcity of labour, insufficient fodder was grown in many instances and for a few years this necessary item remained at a high price so that many cattle were sold that otherwise would have increased the dairy herd. This was particularly true of the year 1920. Conditions have since become more normal but there still remains a great demand for competent dairy-farm labour.

Silos Are Popular.—The silo is rapidly becoming an important factor in connection with dairying in Manitoba, as it is in most dairying countries. Until a few years ago silos were few and far between on the prairies, but since it has been demonstrated that alfalfa can be successfully grown, and since farmers have proved that ensilage corn can be grown with perfect success, they have become quite common crops, and each year sees a large number of farmers adding a good-sized silo to their equipment. Most Manitoba silos are of wood stave construction which can be purchased ready to erect, but a good many of the home-made variety are to be seen, and others built of concrete are not uncommon. In some parts where the climate did not seem adapted to corn, farmers found that oats and peas, which yield very heavy crops, made a very satisfactory ensilage. This mixture produces a very valuable feed as it makes a well balanced ration. Experiments are now being conducted to test the value of sunflower ensilage for dairies. It is believed this fodder, which can be produced in excess of corn, will prove equally satisfactory. For winter feeding, root crops also can be grown to perfection in Manitoba, yields being heavy and quality unexcelled.

THE STANDBY OF THE MANITOBA FARMER

Live-stock production is one of the industries particularly adapted to this province.

Dairy Markets.—The Dairy Branch in 1920 reported that about 25,000 Manitoba farmers were then engaged in dairying to some extent. From 900 to 1,000 shipped milk to Winnipeg during the winter and about 500 during the

summer. About 1,500 shipped sweet cream to the city for domestic use and the other 22,500 marketed the surplus product in the shape of cream for butter-making to one of the 53 creameries in Manitoba. Returns coming in for 1921 show that the steady growth of the industry is even increasing. The supplying of milk and cream for Winnipeg and other local cities and towns is in itself a considerable item while the consumption within the province of butter and cheese accounts for a large share of the dairy output. Outside markets have been extended to both eastern and western Canadian cities, to Chicago, New York and other large United States cities and to Europe. Manitoba creamery butter has established a trade reputation that ensures the permanency of an ample market for all surplus.

The following table gives the estimated quantities, average prices, and value of milk and milk products produced during the year 1921:—

MANITOBA DAIRY PRODUCTION, 1921*

Product	Pounds	Price	Total Value
		$ cts.	$
Creamery butter	8,550,105	0 37	3,163,538 85
Dairy butter	9,888,103	0 23	2,274,263 69
Cheese	269,524	0 19	51,209 56
Milk	167,810,940	0 03	5,034,328 20
Ice cream (gallons)	481,067	1 35	649,440 45
Sweet cream in lbs. Butter-fat for domestic purposes	3,219,661	0 44	1,416,650 84
Total	.....	.....	12,589,431 59

Note.—While the amount of creamery butter produced can be estimated with a considerable degree of accuracy, the estimate regarding some of the other dairy products—notably, dairy butter—has to be an approximation only, conclusive information being entirely unavailable.

As a concrete example of the remarkable growth of the creamery industry in Manitoba, the following records of imports and exports during the past ten years is given:—

IMPORTS AND EXPORTS OF CREAMERY BUTTER, MANITOBA, 1912-21

Year	Imports, carloads	Exports, carloads	Value
			$
1912	55	0	343,960 00
1913	35	0	201,600 00
1914	20	0	142,720 00
1915	.....	50	324,800 00
1916	.....	68	472,192 00
1917	.....	96	827,904 00
1918	.....	175	1,764,000 00
1919	.....	153	1,814,000 00
1920	.....	134	1,650,000 00
1921	.....	108	857,020 00

Government Assistance.—Under the Settlers' Animal Purchase Act of 1916, better known as the "Manitoba Cow Scheme," homesteaders and settlers in the territory between lake Manitoba and lake Winnipeg, which is chiefly

From *Crop Bulletin No. 100*, Department of Agriculture and Immigration, Winnipeg.

valuable as a live stock and dairy country, were assisted by the Provincial Government in securing cattle. Cows are purchased by the Department of Agriculture and resold on easy terms to groups of settlers who could not afford otherwise to secure them. During the first three years of the operation of the Act some 4,570 cows were delivered to the settlers. In 1920 the Government estimated the natural increase at over 10,000 head. The amount of creamery butter produced in this district increased three-fold and the output of cheese, milk, cream and beef in like proportion.

Poultry and Bees

Like nearly all branches of agriculture in Manitoba other than grain-growing, the raising of poultry and the keeping of bees are but infant industries. There are many causes for this state of affairs but they may all be summarized in the one general remark that pioneer conditions are only now being fully surmounted. The province of Manitoba, it must be remembered, is but fifty odd years of age and the rounding-out of its agricultural industry to include the many-sided phases witnessed in older countries is now in process. The clearing or breaking of land, the erection of living quarters and stables and the providing of the necessities of life in the early days of pioneering precluded the indulging in any other than such undertakings as would give the speediest and surest returns. Hence grain-growing was the route to home-making. Seed was procurable, growth was rapid, yields were heavy and markets available. Hence the busy homesteader, struggling under the many difficulties incident to existing circumstances, had no time, means or opportunity for diverging from the orthodox manner of " getting a start."

Poultry Raising.—Several factors kept this very important industry from thriving at earlier dates of which only a few need be mentioned. Inability of settlers to secure parent stock and the high price of building material caused long postponements in acquiring the nucleus of a flock. Lack of time to devote to the details of poultry-raising also accounted for the absence of flocks or indifferent success with them. Depredations of foxes, coyotes, ermine, hawks and other animals and birds of prey made serious inroads into the ranks of poultry. Poorly constructed poultry houses that were unable to withstand summer rains or winter frosts and lack of properly guarded yards accounted for heavy losses and small returns in numerous instances.

Still another reason for the absence of flocks on early homesteads was that in so many cases the pioneer was a single man; for it must be remembered that the farmer's wife is generally responsible for the success of the poultry division. Game was plentiful and the lone bachelor found it less trouble to replenish his table by the use of his shot-gun than by the uncertain task of raising domestic poultry. Prairie chickens, grouse and wild ducks played an important part in the pioneering of Manitoba. Later when a few hens were secured to add to the farm produce they were for home use only, markets being too inaccessible to make a source of revenue. Cold storage, refrigerator cars, and rapid transit came only by degrees, and in recent years only has this industry been commercialized in Manitoba.

Poultry Extension Work.—That it is rapidly becoming an important undertaking, both as a side line on the farm and as a business in itself, is evident from a study of conditions in the province at the present time. The provincial government is giving the industry considerable attention and assistance. The Department of Agriculture, through its Extension Service, gives those interested the benefit of the service of a specialist in poultry-raising. Practical lectures are given through agricultural societies, various institutes,

boys'-and-girls' clubs and other organizations on breeding, feeding, housing, sanitation, marketing and associated subjects. Flocks are inspected, culling demonstration given, eggs from pure-bred stock for hatching purposes supplied and a general survey of the poultry situation has been undertaken. Efforts are being made to encourage more economical and efficient production and more economic marketing.

In 1919 the Poultry Breeders' Act was passed. It incorporates the Manitoba Poultry Breeders' Association and provides for the forming of local organizations and their affiliation with the association. With unlimited space, an agreeable and healthy climate, food supplies in plenty and a ready and steady market for eggs and poultry, the industry has a most encouraging outlook.

Beekeeping.—Manitoba has a great potential wealth in its annual inestimable and ungarnered honey crop. Year after year the nectar-laden flowers that adorn the expansive prairies and sunny glades in countless millions produce the raw material for this delicious food in quantities that can only be designated in terms of tons, while at the same time the province imports the bulk of the honey it consumes. High wages are paid to labourers for harvesting grain crops, the production of which to this stage entailed considerable outlay in time, labour and money, while the services of the bee, who offers to toil ceaselessly without wages in gathering a crop that costs nothing to produce, have been largely overlooked.

The possibilities of the bee-keeping industry in Manitoba have not yet been fully realized, though a start has been made. It has been largely taken for granted that the cold winters experienced, together with the fact that clover and buckwheat are not so widely grown as in other sections where the industry flourishes, would prohibit its success. On the contrary it has been demonstrated by the pioneer bee-keepers of the province, both official and private, that such is not the case.

Wintering.—The principal way of wintering bees in Manitoba is in cellars or basements. They are placed in winter quarters after they have had their last fly for the year, which is usually about the last week in November. They are taken out again when the willows bloom in the spring. Well constructed root cellars have also been utilized with success as winter repositories for bees. In some instances the bees have been wintered out of doors by packing the hives with oat chaff or sawdust. Government officials report that winter losses among bees are no heavier in Manitoba than the average.

The provincial apiarist reports that honey produced from the many different plants of Manitoba has a flavour and body that cannot be surpassed. It might also be remembered that the growing of clover is being more widely practised in Manitoba from year to year. The principal honey and pollen plants of Manitoba are clovers. golden-rods, asters, dandelions, willows, fruit bloom, thistles, mustards, snow berry, basswood, fireweed, raspberry and pollen-producing trees such as oaks and poplars. There need therefore be no apprehension concerning lack of suitable nectar.

Bee Diseases.—Another feature of the industry that must be considered is the prevalence of, or liability to, disease. Bee disease is a problem among apiarists in every country. Three forms are recognized, namely, European foulbrood, American foulbrood and sackbrood. If recognized in their early stages, these diseases can be eradicated with little loss, but if allowed to get a strong foothold will necessitate the destruction of whole colonies. American and European foulbrood for a time threatened disaster to the Manitoba bee-keeping industry but the prompt and energetic action of the Provincial Govern-

ment has practically stamped it out. Sackbrood has made an appearance but has not become serious. Bee-keepers are confident that disease in Manitoba can be kept under control as fully as in other honey-producing regions. In 1914 legislation known as the "Foul Brood among Bees Act" was introduced to provide for measures aiming at the control of bee diseases.

Inspection of Apiaries.—The Bee-keepers' Act of 1915 was passed by the Provincial Government to provide for the incorporation of the Manitoba Bee-keepers' Association with a view of enabling the apiarists of Manitoba to promote their mutual interests. An inspector of apiaries was appointed and, as a result, the threatened spread of disease has been about entirely eradicated. A provincial apiarist was also added to the staff of the Department of Agriculture. Bulletins have been issued and series of lectures arranged for the benefit of those embarking on this enterprise. These active steps on the part of the government for the encouragement and betterment of the industry augur well for its successful expansion.

The provincial apiarists estimate that in 1921 there were about 1,000 bee-keepers in the province, 560 of whom were listed with the department. The three or five-banded Italian bee is said to be the most popular in Manitoba. It is reported easier to handle than "The Blacks", shows less tendency to swarm, winters well and is more resistant to disease. The price of bee supplies has been materially reduced; many keepers are installing labour-saving machinery, their numbers are constantly increasing, the market is unlimited and prices are good, and this infant industry promises to develop rapidly.

The year 1921 was an exceptionally successful one for Manitoba bee-keepers. The number of hives increased from 7,593 in the spring to 14,721 in the fall. The production of honey for the season was approximately a million pounds or an average of 118 pounds to the hive.

Fruits and Vegetables

Comparatively few people, even in Manitoba, realize the fact that a multitude of species of fruits and vegetables, heretofore generally believed entirely foreign to conditions found on the plains of Western Canada, can be successfully and abundantly grown in this province. After the remarkable suitability of Manitoba, for grain-growing was demonstrated, a large percentage of the interested public still deplored the disadvantages that settlers would suffer because they could not produce the accustomed crop of fruit and vegetables. Like the early prophecies respecting wheat, these beliefs have been shown to be erroneous. From what has already been accomplished, it is safe to say that, in the growing of many lines of fruit, Manitoba is assured of success, while in its vegetable production, both in range of species and excellence of quality, it stands second to no other country.

Apple Growing.—The horticultural branches of both Provincial and Federal Governments, together with various local horticultural societies, are leading the way by introducing such varieties of fruits and such methods of cultivation as will guarantee the success and permanency of this occupation. A few years ago none but the most optimistic would have believed the growing of apples possible in Manitoba, The annual apple and crabapple crop from a single orchard near Morden now amounts to 200 barrels. Single trees have been reported as producing in one crop over seven barrels of apples of delicious flavour and excellent cooking qualities. Because of the cold winters that prevail most residents are timid about setting out fruit trees, fearing the freeze-back might be ruinous. True, trees do suffer in this respect; some winters severely,

other winters but little, but it does not appear, in the light of achievements, that this trouble is so serious as to prevent good average results. Steps taken to combat it are the providing of shelters or windbreaks, by either planting the trees in sheltered localities or by setting out shelter trees or building tight fences, and the selection of hardy species that thrive in colder climates.

APPLE GROWING IN MANITOBA

Many orchards are coming into production, and the raising of fruit is a rapidly expanding industry.

Hardy Varieties.—Plums and cherries too are being grown. The provincial demonstration farms are experimenting to determine the varieties best suited to the province and to raise, through local nurseries young stock of the required hardiness. It is safe to say that the raising of at least a few varieties of apples, crabapples, plums and cherries will be quite common on Manitoba farms in a few years. The advantages of producing even one's own requirements in this respect is deserving of any special care that may be demanded.

Small Fruits.—With smaller fruits and vegetables, mother earth needs but to be given an opportunity to produce. The growth is rapid and the yields are most abundant. Wild fruits of smaller varieties grow in great profusion as far north as the Churchill river, while wild plums are found in the southern parts of the province. Raspberries, strawberries, saskatoons, currants and gooseberries are the principal wild varieties found. In cultivated gardens, great success is obtained with white, black and red currants, red and black raspberries, logan berries, gooseberries of several species and strawberries. For home use, a pleasing feature of small-fruit cultivation is that the replacing

process is more gradual than in many fruit sections, giving a longer period of gathering. Many growers report the strawberry as continuing to yield till the middle of October.

Vegetables Do Well.—The passing of the experimental stage is even more marked in vegetable growing. It was early demonstrated that the rich soils, long days and cool nights, ample moisture and remarkable freedom from diseases and insect pests, found in Manitoba were admirably suited to the growing of the more common vegetables. Potatoes, cabbages, cauliflower, celery, beets, carrots, turnips, mangels and parsnips responded with a rapidity of growth that delighted the early settlers. The abundant yield and excellent qualities were almost unbelievable.

The more tender varieties were tried out with considerable misgivings, but, as experience taught the gardener, he grew bolder and year after year added to his list until now practically all the varieties of the Canadian kitchen garden may be found in Manitoba. Table corn, asparagus, pumpkins, squash, marrow, cucumbers, melons, beans, peas, peppers, tomatoes and numerous other species are grown with success. Field root crops are equally prolific and are being more and more resorted to for the feeding of live stock on the farm or dairy.

At the International Soil Products Exhibition, held at Kansas City, Missouri, in 1918, Manitoba won the first prize for display of vegetables, and in 1919 at the same place and under the same conditions repeated the performance. For the most attractive exhibit, including grains, vegetables and fruits, Manitoba won first place in 1918 and second place for the most comprehensive exhibit.

At the Provincial Soil Products Exhibition held in Winnipeg in January, 1922, a display of Manitoba-grown grains, fruits and vegetables was presented that would convince the most skeptical of the possibilities of horticulture in this province.

Manitoba Agricultural College

The first definite step towards higher agricultural education in Manitoba was taken in 1902 when the Provincial Legislature appointed a commission to inquire into the possibility of establishing an agricultural college. The report of the commission was favourable to such action, and in 1903 an Act was passed providing for the establishing of the college and outlining its method of government. In 1905 building operations began, and in November, 1906, the college was formally opened. In 1907 it was affiliated with the University of Manitoba so that the degree in agriculture might be conferred on students who had successfully completed the five-year course. In 1912 the college was granted degree-conferring powers, but in 1916 an Act was passed providing for reaffiliation with the University of Manitoba.

Governing Board.—The Provincial Legislature makes appropriations from year to year for the maintenance and equipment of the college. The governing body is a board of ten directors, one elected by the United Farmers of Manitoba, one by the Live Stock Association, one by the agricultural societies, one by the Manitoba Agricultural College Alumni Association and five by order in council. The Minister of Agriculture is ex officio a member of the board.

The college is beautifully located on a bend of the Red river, immediately south of and adjacent to the city of Winnipeg. The present site was but recently chosen and the buildings, equipment and general surroundings are most modern and scientific in construction and arrangement. Tuition and residence accommodation are provided for 500 students divided in the proportion of about three

men to two ladies. The curriculum embraces, in addition to the usual agricultural course, a course in home economics, a wide and varied extension service and general agricultural investigation and research.

The Buildings.—The Administration building standing in the centre of the campus, with the other buildings grouped around it, presents a commanding appearance. Besides executive offices, it contains a library, reading rooms, class-rooms, and accommodation for the Department of Field Husbandry and the Division of Home Economics.

In the Horticulture and Biology building the whole ground floor is given over to horticulture, entomology and forestry, and a museum. The second floor is occupied by the Department of Biology. The Department of Bacteriology occupies the third floor. Connected with this building are the green-houses.

MANITOBA AGRICULTURAL COLLEGE

With agriculture as the predominant industry of Western Canada, agricultural education is well provided for.

The Chemistry and Physics building is absolutely fire-proof and furnished with the most up-to-date apparatus for the teaching of agricultural chemistry, agricultural physics, and mathematics.

The Engineering building is a large structure, 156 by 110 feet, and three full storeys in height. On the ground floor are the forge shop, and engineering laboratory, a concrete laboratory, class-rooms and offices. The second floor contains the wood shop, the machine shop and the drafting room. The third floor is chiefly used for instruction in farm machinery. The dairy is a smaller but very handsome building and is used entirely for the work of dairy husbandry—buttermaking, cheesemaking and milk-testing.

The stock-judging pavilion is 150 feet long and 75 feet wide and is built of brick and stone with concrete floors. In the centre of this building is the large judging arena where the various classes of live stock are brought in for judging work. This area is surrounded by a gallery with seating accommodation for large classes. In this building are refrigerator rooms, butcher's depart-

ment, emergency stables and the veterinary science laboratory. Near the pavilion are separate barns for horses, dairy cattle, beef cattle, swine and sheep, all built on the most approved plans and all brick veneered.

The poultry plant consists of a main poultry building, 60 feet by 40 feet. It is of solid brick and cut stone and contains lecture rooms, incubator rooms and egg rooms. Grouped around this are the poultry fattening house 60 feet by 30 feet, a brooder house, and three laying houses, each 120 feet long.

The students' residence and auditorium, along the south bend of the river, is 550 feet in length with long wings running to the rear. It is three storeys in height, with basement and sub-basement, and contains accommodation for about 300 men and 200 women. The auditorium has a seating capacity of 1,200. It is used for all meetings of the whole student body, for farmer's convention, entertainments and final examinations.

Courses of Instruction.—The following courses of instruction are given at the college:—

(1) A three-year course in Agriculture, on the completion of which the college gives a diploma. A student who has not the time to complete this course may take either one year or two years of the course. Each year's work is complete in itself.

(2) A two-year course in Home Economics, on the completion of which the college gives a diploma.

(3) The five-year course in Agriculture, leading to the degree of Bachelor of Science in Agriculture (B.S.A.).

(4) The five-year course in Home Economics, leading to the degree of Bachelor of Science in Home Economics, B.Sc. (H.E.).

(5) A two months' course in Engineering.

(6) A five months' Home Maker course for young women who can spend only one winter at college.

(7) A ten weeks' Creamery and Cheese Factory course.

(8) A two weeks' Rural Leaders' course. Ministers and their wives in rural charges and Y.M.C.A. workers form the greater number of those in attendance at this course, although anyone in rural community work may attend.

(9) Summer courses for teachers and others under the auspices, and with the co-operation of, the Department of Education.

(10) A six weeks' midsummer session is planned to enable degree students to study crops, experimental plots, plant breeding, vegetables, weeds, insect pests and plant diseases in the field.

(11) Courses are offered for those who wish to specialize in Dairying, Engineering or Horticulture.

Extension Work.—The extension work of the college includes correspondence courses, for the benefit of those who cannot leave home, on the following subjects: (1) Poultry Husbandry, (2) Drawing—Building Construction, (3) Soil Management, (4) Dairy Husbandry, (5) Farm Records and Accounts, (6) Manitoba Weeds, (7) Botany and Nature Study, (8) Vegetable Gardening.

The work also includes special correspondence and the preparation and publication under the authority of the Minister of Agriculture of various timely bulletins on agricultural topics. The college also co-operates with the Extension Service of the Department of Agriculture in giving a limited amount of service in the form of addresses at meetings o fgrain growers' associations, women's institutes, community clubs, or other organizations, either in town or country, and judging at fairs.

Research.—In addition to teaching what is now known about the science and practice of agriculture to the students who attend the institution, and extending this information by close co-operation with the Extension Service of the Department of Agriculture to those of the rural population who are not in a position to take one of the courses at the college, a third line of work, and the one that has probably the greatest bearing on the success of the agricultural industry of the province, is that of investigation and research. While much has been accomplished in recent years in the solution of many agricultural problems, there are constantly arising new problems and new phases of old problems that demand an early solution if large material losses are to be prevented. The farming problem relating to the production of crops and of live stock, the economic questions having to do with the business of farming, and the social problems relating to the home and rural life, are constantly receiving such attention as the members of the different departments can give after the other necessary services in connection with instruction are provided for.

The policy of the college with respect to investigational work is to diagnose as accurately as possible the various problems as they arise, and, by the aid of science and practical experiment and such community organization as seems desirable, to attack them in the order of their importance, having in mind the greatest possible advantage to the State as a whole. The results of these investigations are, of course, passed on to the students through the regular teaching courses, and to the public through the various forms of extension work.

CHAPTER VII

Cities and Municipalities

THE city of Winnipeg is the capital of the province of Manitoba and the largest city in Western Canada. By virtue of its strategic location it is the gateway to the prairies and exerts a dominating influence over their development. Situated in latitude 49° 54′ N., longitude 97° 08′ W., at the confluence of the Red and Assiniboine rivers, it is 40 miles south of lake Winnipeg, 60 miles north of the boundary line between Canada and the United States of America and almost midway between the Atlantic and Pacific oceans. Its altitude is 760 feet above sea-level.

From a Hudson's Bay Company trading post (Fort Garry) in 1870, with a population of 215, Winnipeg has become a city of 180,000 people. When the city was incorporated in 1873, there were 1,869 inhabitants. With the advent of railway connections a steady stream of travel and trade, with influx of population, began, and has resulted in the building up of a city of a size and importance that is exceeded by only two other cities in Canada.

A Key City.—Winnipeg is now the greatest grain centre on the American continent and the financial, commercial, wholesale and manufacturing centre of the middle west. Owing to its geographical position, its very complete railway facilities, with branches reaching out in every direction, it affords great possibilities for trade in the province and in the Northwest and offers special advantages for the establishment of manufacturing and other industries. Through its municipal hydro-electric system, it supplies the cheapest electric power of any city in North America. The new soft water supply is adequate for the needs of a city of one million inhabitants.

The city council is composed of a mayor and eighteen aldermen. The mayor is elected annually from a vote of the entire city. Three aldermen are elected annually from each of the three wards into which the city is divided, and hold office for a term of two years. The proportional representation system of voting has been inaugurated, having been used for the first time in the civic elections of December 3, 1920.

Winnipeg has a land area of 14,865 acres to which might be added 422 acres covered by water and 634 acres of land outside the city limits proper but practically constituting part of the city, thus giving a total area of 15,921 acres, or 24·8 square miles. The city has 500 miles of streets, 236 miles of lanes, 148 miles of granolithic sidewalks, 385 miles of plank sidewalks 257 miles of sewers, 120 miles of boulevards, 296 miles of water mains and 90 miles of street railway within the city limits, or 111 miles in all, belonging to the Winnipeg Electric Railway Company. The rate of taxation in 1920 was 22·5 mills, and the total assessment was $238,000,000. The debenture debt, including local improvement debentures, was a little over $45,000,000. The death rate in 1920 was 11·79 per thousand population and the birth rate 32·06.

An Educational Centre.—It is the educational centre of the province. School statistics show that in the year 1920 there were 59 buildings, valued at over $7,000,000, attended by 33,352 pupils under the instruction of 771 teachers and specialists. In addition over 5,000 pupils and 170 teachers were enrolled in evening schools. Children's playgrounds are liberally supplied. A public library distributes books through a main library building, two branch libraries and thirty-two stations.

There are 31 public parks and squares in Winnipeg, with a total area of 674·03 acres. These, with the exception of Assiniboine and Kildonan Parks, are located within the city limits. Three police stations are operated and some 24 miles of streets patrolled. The fire department consists of 284 officers and men operating on the two-platoon system of 10 hours and 14 hours, respectively.

The city owns and operates its own hydro-electric power system, stone quarry, fire alarm system, police signal system, fire service, water works, asphalt plant and gravel pit. It enjoys the distinction of being the first city in America to acquire a municipal asphalt plant.

MODERN WINNIPEG

Scene on Portage avenue, looking west from Main street. At this point the trails of the Indians centred.

Winnipeg is a city of beautiful and substantial homes. Residences, streets, parks, schools, churches and public buildings compare favourably with similar institutions in any city of corresponding size on the American continent. The new Manitoba Provincial buildings, many commercial and office buildings and the Canadian Pacific and Canadian Government railway terminals with their respective hotels, the Royal Alexandra and the Fort Garry, are worthy of special mention.

Water Supply.—Winnipeg's new water supply system is one of the five greatest undertakings of its kind in the world. In 1913 a comprehensive scheme was promoted to supply the city and contiguous territory with an abundant supply of pure and soft water, and this resulted in the creation of the Greater Winnipeg Water District.

The area comprising this district includes all of the city of Winnipeg, part of the city of St. Boniface, part of the town of Transcona and parts of the

municipalities of St. Vital, Fort Garry, St. James, West and East Kildonan, having a total area of 51·88 square miles.

Shoal lake, from which the water is drawn, without drawing upon the main Lake of the Woods, can be depended upon to furnish all the water needed for Winnipeg until the population shall have reached about 850,000, and with the help of Lake of the Woods can furnish a practically inexhaustible supply. The water of Shoal lake is of excellent quality for domestic and manufacturing purposes. The total length of the aqueduct is 96·5 miles. The concrete portion of the aqueduct has a capacity of 100,000,000 imperial gallons per day, and the pipe line portion is capable of discharging 30,000,000 gallons into the reservoir. The water from Shoal lake was first distributed to the city on April 5, 1919.

Brandon

Brandon, the second largest city in Manitoba, has a population of 15,397 according to the census of 1921. Situated on the bank of the Assiniboine river, 133 miles west of Winnipeg, it occupies an important position in the heart of the great wheat belt of southwestern Manitoba. Like many other western centres it had its origin as a trading post and was formerly reached from Fort Garry by canoe

BRANDON COLLEGE, BRANDON, MANITOBA

Many prominent Baptist ministers have passed through this college.

or by overland travel. Being located on the main line of the Canadian Pacific railway, its growth was rapid following the inauguration of surveys on this line in 1886. It is now also served by the Canadian National railway, the Great Northern railway and a number of branch lines radiating into the rich surrounding territory. A system of good country roads leads out in every direction to the great wheat fields surrounding it.

Compactly built, yet not crowded, the city presents a prosperous aspect. Its educational system includes several colleges, collegiate institutions and public

schools. Municipal enterprises include a motor fire department, an electric street railway and an electric light and power plant, a central heating plant, a gas and power plant, 28 miles of water mains, 23 miles of sewers and 29 miles of granolithic sidewalks.

In the business section are found about 20 large wholesale houses and a large range of retail houses of the first rank. Nearly all the important farm implement manufacturers of Canada and the United States have distributing houses at Brandon. Being the centre of a rich agricultural district, it has an extensive trade in agricultural products and farm commodities of all kinds.

Important industries include flour and oatmeal mills. There are also several manufacturing plants, brick works, creameries and other industries.

Brandon is the seat of Manitoba's provincial exhibition, held annually in the summer time, and of the Manitoba Winter Fair which has done much to encourage the production of beef cattle, sheep, swine, horses and poultry. It is one of the greatest live stock winter fairs in Canada and ranks with the great International of Chicago.

Portage la Prairie

Portage la Prairie is one of the most pleasing of several small cities found on the great plains of Western Canada. It is beautifully situated in the heart of the far-famed Portage Plain, the finest wheat-producing district in the world. In every direction the rich fertile plains stretch away to an unbroken circle of horizon.

The city is located on the main line of the three great Canadian transcontinental railways and is a terminal of the Midland railway connected with the Great Northern to the south. It is 56 miles west of Winnipeg and about midway between Montreal and Vancouver. There are more than 40 miles of trackage within the municipal limits and, in addition to the main line, a number of branch lines radiate in various directions.

The population is 6,766. It has an unlimited supply of pure water, a modern water works plant owned by the city and a splendid sewerage system. Hydro-electric power is delivered from the city of Winnipeg over a steel tower transmission line. Low rates for domestic lighting and cooking are available and rates for power are very favourable.

Important industries are two large flour mills, one oatmeal mill, a structural casing foundry, plants manufacturing gasoline engines and threshing machinery, steel bins and culverts and three large brickyards. With cheap hydro-electric power, excellent sites and favourable labour conditions Portage la Prairie offers unusual inducements to manufacturers.

Like Brandon, it is a city of homes. Its streets are well shaded, wide and clean. Boulevards, parks and drives with attractive rows or clusters of trees break the monotony of the prairie aspect.

St. Boniface

The city of St. Boniface is located on the east side of Red river at the mouth of the Seine and directly opposite the mouth of Assiniboine river and the city of Winnipeg. It is one of the oldest settlements in Manitoba, dating from the time of Selkirk's Red River colony. At this point Roman Catholic missionaries established their headquarters over 100 years ago and the school founded by them in 1880 has developed into the present St. Boniface College.

St. Boniface is the centre of authority of the Roman Catholic church in this province and the see of the Archbishop of the ecclesiastical province of St. Boniface. The French-speaking population predominates and the city is the home of many institutions particularly associated with this religion and tongue. St. Boniface College, which now forms by affiliation part of the University of Mani-

toba, heads the educational institutions. In addition are found a normal school, two collegiates, a seminary, three public schools, a convent, a boys' academy, and an orphanage. There are also two hospitals, four churches and an old folks' home. The population is 12,821.

The city is well supplied with transportation facilities, being served by the Canadian Pacific, Canadian National, Grand Trunk Pacific and Great Northern railways. It also has electric railway connection with Winnipeg. These railways all have extensive yards in St. Boniface and its position as a transportation and shipping centre is important.

One of its most important industries is that associated with the union stockyards which have been described in a preceding section. The business connected with the marketing and shipping of live stock and the abattoirs and packing plants that are growing up in the vicinity of the stockyards give to St. Boniface a position of primary importance in the meat business. The milling, storing and shipping of grain is also reaching large proportions in this city.

St. Boniface is, save for its individuality of municipal government, practically a part of the city of Winnipeg and is usually included or partly included in the "Greater Winnipeg" area. It shares with Winnipeg the Shoal Lake domestic water supply and the advantages of abundant and cheap hydro-electric power for domestic and manufacturing purposes. Though nominally a distinct municipality, its growth and development will no doubt keep pace with that of the adjoining city of Winnipeg.

Towns and Villages

In addition to the four cities described in preceding pages, there are in Manitoba, according to provincial statistical information for the year 1921, some thirty towns and twenty-one villages. With few exceptions these municipalities are of the "country" variety, being scattered throughout the great agricultural areas of the province. Their principal function is the transaction of business directly connected with the agricultural industry, on which they are dependent for their prosperity. A small percentage have sprung up as centres of fishing, mining or lumbering industries or in connection with the fur trade, transportation systems or as summer resorts.

Many of these municipalities, however, show promise of developing along special industrial lines. Lack of domestic coal for power purposes is being largely offset by development of water-powers. Manufacturing and milling is extending rapidly to many smaller centres, where favourable conditions prevail. The development of the natural resources of the province will widen the scope of industrial establishments and the ever-increasing population will create a greater demand for commodities that can be produced at local points.

A list of the towns and villages of Manitoba, with their population, as given by the Provincial Government is shown below:—

TOWNS AND VILLAGES IN MANITOBA, 1921

I. Towns

Town	Population	Town	Population	Town	Population
Beausejour	1,000	Hartney	510	Russell	920
Birtle	625	Killarney	925	Selkirk	3,575
Boissevain	846	Melita	658	Souris	1,686
Carberry	785	Minnedosa	1,493	Stonewall	849
Carman	1,400	Morden	1,220	Swan River	898
Dauphin	4,500	Morris	803	The Pas	1,561
Deloraine	647	Neepawa	1,766	Transcona	4,136
Emerson	1,158	Oak Lake	464	Tuxeda	527
Gladstone	791	Rapid City	533	Virden	1,449
Grandview	701	Rivers	837	Winnipeg Beach	125

II. Villages

Village	Population	Village	Population
Binscarth	272	Pilot Mound	461
Brooklands	2,000	Plum Coulee	357
Elkhorn	572	Roblin	620
Foxwarren	246	Rossburn	488
Gilbert Plains	566	Shoal Lake	694
Gimli	396	Ste. Rose du Lac	443
Gretna	509	Teulon	520
Hamiota	598	Wawanesa	366
Lyall	226	Winkler	788
Manitou	578	Winnipegosis	759
Napinka	400		

Rural Survey Systems

Before the Crown lands of the province are thrown open for settlement or otherwise disposed of they are first surveyed into parcels of the required dimensions according to a regular system of subdivision adopted by the Dominion Government. Certain lands occupied by the original settlers were exempted from this system.

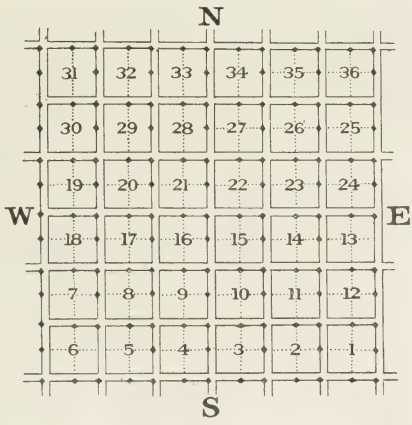
A Rectangular System.—The Dominion Land system of survey is the most comprehensive in the world. It extends uniformly over almost the whole of the western prairies and is especially adapted to a plains country. Its checkerboard style enables one to determine the location of a given piece of land, either in the field or on the map, with despatch and accuracy, while its regular north-and-south and east-and-west lines give a succession of rectangular farms. The disadvantages that would arise from any system of surveying resulting in triangular fields are only too obvious when one remembers that agricultural operations are now carried out on a large scale with power machinery throughout the West. The rectangular fields of the plains are ideal for such extensive farming operations.

The unit of survey is the township, being a quadrilateral area approximately 6 miles square containing 36 sections, each of 640 acres or 1 square mile, which on being divided into four equal parts gives the homestead quarter-section of 160 acres. The sections are numbered from the southeast corner, westerly across the township from 1 to 6, thence back along the next tier of sections, across again on the next, and so forth, leaving section 36 in the extreme northeast corner as shown on the accompanying illustration. Quarter-sections are denoted according to the quadrants of the compass, northwest, northeast, southwest and southeast quarter-sections respectively.

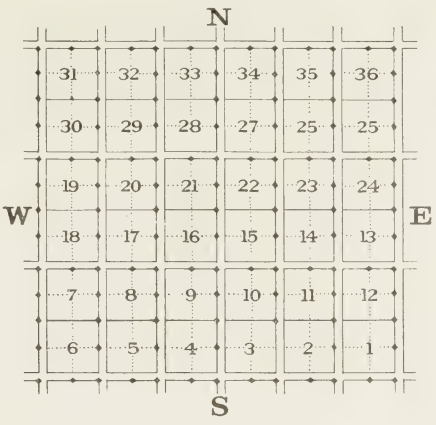
The lines bounding a township on the east and west sides are true meridians, and those on the north and south sides are chords of the parallel of latitude passing through the corners of the township. These "block" townships are designated entirely by the numerical system and bear no individual names. Commencing at the 49th parallel of latitude (international boundary) they number from one upwards in regular order northerly. Tiers of these are called ranges and they are numbered in regular succession westerly, and in certain cases easterly, from certain true north and south lines which have been adopted and surveyed as standards. These standards are called "Meridians" and those affecting the surveys of Manitoba are the Principal or First, which is located approximately in Long. 97° 27′ 30″ West, passing about 12 miles west of the city of Winnipeg; the Second, in Long. 102° West, and the Second East in

SYSTEM OF SURVEY OF DOMINION LANDS

PLAN OF A TOWNSHIP
(FIRST SYSTEM)

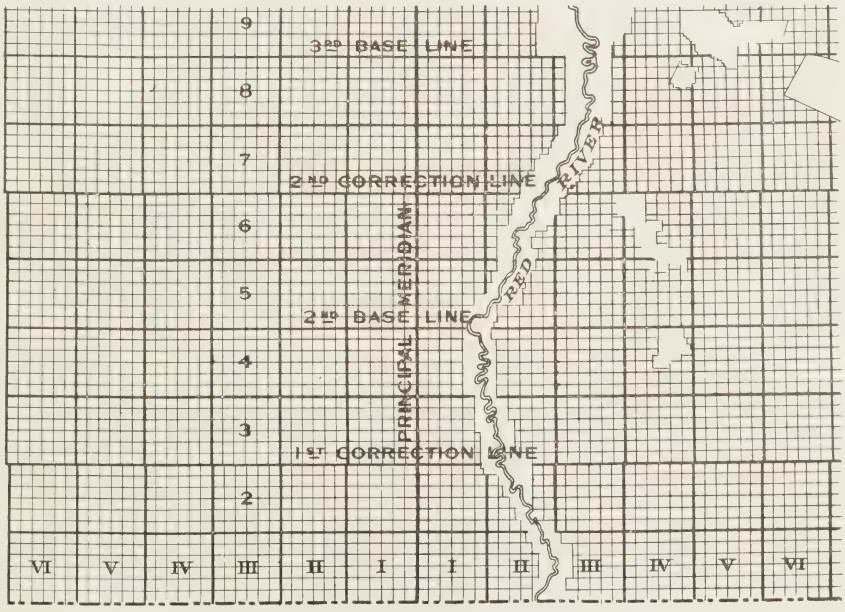


PLAN OF A TOWNSHIP
(THIRD SYSTEM)



Survey monuments shown thus.....✦

TOWNSHIP AND RANGE SYSTEM



INTERNATIONAL BOUNDARY 1ST BASE LINE

Range numbers shown thus...I II III IV
Township.....,,... .....,,.. ....,,... ...1 2 3 4

Long. 94° West. Except between the Second East and Principal Meridians, and the Principal and Second Meridians, there is a regular interval of 4 degrees of longitude between these main lines. The Second forms the northern part of the Manitoba-Saskatchewan boundary, the Third, in Long. 106 passes through the centre of the province of Saskatchewan, the Fourth, in Long. 110 degrees, is the Saskatchewan-Alberta boundary, while the Fifth in Long. 114, passes through the city of Calgary and a few miles west of Edmonton.

Base Lines.—At 24-mile intervals north of the 49th parallel of latitude lines are run westerly from one principal meridian to the next, following the same parallel of latitude by deflecting at every township corner. These are called base lines and are the basis on which the townships are first laid out, the 49th parallel being the first. Commencing at a main meridian a township is laid out by measuring off six sections of the precise width of 80 chains (1 mile) with a road allowance adjoining each. The township outlines are then run north and south to a depth of two townships in each direction, that is half way to the adjacent base lines on either side. Owing to the convergence and divergence of all meridian lines, these township lines will converge north of the base lines and diverge to the south of it, hence the lines run north from one base line will not connect with those run south from the next base line above it when the townships come together, but will necessitate a jog. The outlines of the township are completed by joining the corner with east-and-west lines and the line between townships on which the jog occurs, that is midway between the base lines, is known as the correction line.

Road Allowances.—The number and the width of road allowances between sections are not the same in all parts of the country. There are also slight technical differences in the methods of subdividing townships which are not of interest here, but from these causes arise five different forms or systems of survey. Only two of these apply to Manitoba, namely, the first and the third. In the first system of survey, which was introduced in Manitoba in 1870, there is a road allowance of one chain and 50 links (99 feet) on every side of a section. All the southern part of the province, exclusive of the exemptions referred to earlier, is laid out on this system. West of lake Winnipeg it extends as far north as a line passing a few miles north of Dauphin, and, in the extreme eastern part of the province, as far north as the Grand Trunk Pacific railway. In the third system of survey, which earlier became the prevailing system in the prairie provinces, there is a road allowance of one chain (66 feet) in width along each section line running north and south and along every alternate section line running east and west.

The interior or subdivision lines of a township consist of north and south lines adjoining every section and east and west lines adjoining every section in the first system of survey and every second section in the third system, with road allowances of 1 chain and 50 links in width for the first system and one chain in width for the third system in all cases. Only one side of a road allowance is surveyed out and marked on the ground, except in the case of correction lines, where it is necessary on account of the jogs to mark the lands on each side of the road independently. Other exceptions arise in certain cases, for instance, where Indian reserves or other irregular parcels of land intervene. The lines regularly run consist of the east boundary of every section, and in the first system the north boundary of every section or in the third system the north boundary of the second, fourth and sixth tier of sections, that is, the survey monuments will be found on the west and the south sides of the roads. A post is planted every half mile, exclusive of road allowances, that is at every section and quarter section corner along the lines run. Township corners are marked by posts of a larger size than those used for sections and quarter section corners.

In laying out the townships along the base lines, the measurements, being carried from one meridian to another, rarely, if ever, give an exact number, hence fractional townships occur closing on the meridian. Owing to the convergence of these meridians themselves the length of each succeeding base line diminishes, hence the number of township widths or ranges will run out as the system is extended northerly. The accompanying diagrams illustrate this effect.

Legal Subdivisions.—To facilitate the descriptions for letters patent of less than a quarter section, every quarter-section is taken to be divided into quarter quarter-sections each of 40 acres more or less, and such quarter quarter-sections are styled legal subdivisions and are numbered from 1 to 16 in similar manner to the numbering of the sections of a township, and as shown on the accompanying diagram.

Survey posts were originally of wood, then iron posts were introduced for township and section corners, the former being of larger diameter, while wooden posts were used for quarter-section corners. Later iron posts were used entirely, while during the last few years a new style of tubular post set low in the ground and with a bronze cap has been introduced. The corners were further marked by digging a set of four pits about the post, each pit being 3 feet square and 18 inches deep. In wooded areas a pyramid-shaped mound was also built at the post. Where a corner fell in a pond or other unsuitable place it was perpetuated by erecting a witness monument on the line at the nearest edge of such obstruction and recording on the post the distance and direction of the true corner. A circular trench was dug about such post and in the woods a cone-shaped mound was also built. The usual marking of the post is in Roman numerals, giving the number of the section at the northeast corner of which it stands, followed by the townships and range, for instance, X, XII, XV reads northeast corner of section 10, township 12 and range 15. The meridian is not stated as a locator will know this. A quarter-section post is merely marked "$\frac{1}{4}$".

It will be observed that the lines of these systems of survey are run out on the ground irrespective of topographical irregularities except in the case of large bodies of water or inaccessible mountains. The land is thrown open for homestead on the basis of such survey. The old trails of the prairies followed the most direct routes or lines of least resistance so that new roads are required to keep pace with settlement. It is often found impracticable to construct such exactly within the confines of the stereotyped road allowances. Ponds, steep cut-banks, or other obstacles frequently occur. Hence the highway engineers of the province, who construct the roads, find it necessary to make road diversions which are laid out around such obstacles by Provincial surveyors, attached to the Department of Highways. There is another form of survey which may be used in remote parts of the country and which is chiefly resorted to in survey of mineral claims, namely, the group lot. Parcels of land so surveyed are designated by lot and group numbers which are furnished the field surveyor on application to the head office.

Surveys on federal lands are made by Dominion land surveyors but to an association of Manitoba land surveyors with provincial jurisdiction are entrusted such surveys as concern alienated lands. The original survey of a homestead would be made by a federal surveyor but a subdivision of such parcel of land after the Crown grant has been issued would fall within the scope of the provincial surveyor.

CHAPTER VIII

Industries

MANITOBA is but on the threshold of an industrial career which promises to be a most active, extensive and permanent one. In earlier days, industrial enterprises, for obvious reasons, were not considered practical nor profitable. Raw materials, power facilities and skilled workers necessary for the successful prosecution of such undertakings were not readily nor economically available. Hence it was found more expedient to import the finished article even at the cost of heavy transportation charges and loss of valuable time en route. Naturally, as the province grew, the importing business expanded and gave rise to an extensive wholesale trade which largely centralized in the strategically located city of Winnipeg.

Wholesale Trade.—So thoroughly and extensively has this wholesale business been organized that Manitoba retail merchants are enabled to secure practically all trade requisites from the great and varied stocks kept on hand in the large warehouses of Winnipeg and other cities. Freight charges are kept to a minimum by importing in car-load lots, and delays to the consumer are avoided by the ability of the wholesaler to fill orders from stocks kept constantly replenished. But no system of wholesale supply, however perfect, can economically supplant the industrial life of a state, and Manitoba is now fast developing industrially.

Manufacturing

Manufacturing began in Manitoba in a small and uncertain manner. The advantages of being able to convert available raw material into finished products were obvious, but the disadvantages were also great. The Eastern Canadian cities were far distant, which meant long freight hauls on goods imported from them, while duties must be paid on articles secured from the south. If favourable conditions for local manufacture could be found, it was evident that success must crown such undertakings. But chief among the early drawbacks was the lack of coal for power purposes. Since it has been found that the province has more than sufficient water-power to compensate for lack of coal, this great obstacle has largely disappeared.

Among the many factors necessary for the successful prosecution of the manufacturing industry may be mentioned the following: (1) abundance of suitable raw material; (2) ample, steady and cheap power; (3) skilled, semi-skilled and common labour; (4) suitable factory sites and living conditions for employees; (5) transportation facilities, and (6) markets. All of these requirements are fully met in the province of Manitoba. In many cases the inducements are more than ordinary.

Supply of Raw Material.—A few special features may here be mentioned. The supply of raw material is most extensive. In this connection, it is only necessary to recall that Western Canada is an agricultural country of major proportions, producing annually upwards of 400,000,000 bushels of grain besides live stock, dairy products, vegetables, flax straw and other supplies in like proportion. As nearly all farm produce exported passes easterly through Manitoba the opportunity of securing this class of material is of the best. Winnipeg is the centre of the grain market of Western Canada and St. Boniface that of the live-stock market. The products of the forests of Manitoba are no mean

consideration, great quantities of pulpwood especially being available. The mineral resources are also extensive, though not as well known. Limestone, gypsum, clays and sandstone are being extensively utilized at present, but a much more varied assortment is available. Raw furs, hides and wool are being shipped out of the province in great quantities.

Water-power.—Manitoba is very liberally endowed by nature with water-power. The present installations produce a total energy of 159,825 horse-power and the ultimate installations will give a total of 306,325 horse-power. The total power possibilities of the province at known sites, with storage, have been estimated to be in the neighbourhood of 5,000,000 horse-power. As hydro-electric energy is fast supplanting steam power in manufacturing industries, the supposed handicap of lack of coal is no longer considered in Manitoba. Cheap hydro-electric power for manufacturing has been available in Manitoba for over ten years and rates have now been reduced to the lowest in America. Power for manufacturing purposes is exceptionally attractive in the Greater Winnipeg district, including the cities of Winnipeg and St. Boniface and numerous surrounding villages, and in Brandon and Portage la Prairie.

Labour Supply.—Labour is now quite plentiful in the cities of Manitoba. Practically all the common skilled trades are represented, while the tides of immigration bring to the country many unskilled workers who drift into the cities. In a following section more information will be found in this connection. Winnipeg is the labour headquarters of Western Canada. Federal and provincial legislation aim to provide for conditions to the ultimate advantage of both employer and employee.

Industrial Sites.—In a new country such as Manitoba, the securing of manufacturing sites and of locations for employees' homes is a much simpler matter than in older settled countries. It is to the interest of ambitious towns and cities as well as of transportation companies to see that suitable sites are always available for new industries. Special inducements to manufacturers are offered by some municipalities, while others act in a more indirect but none the less effective way by providing general conditions that favour such undertakings. The great hydro-electric and domestic water-supply systems of Greater Winnipeg have made the manufacturing prospects of this district peculiarly attractive. Industrial sites with ample railway sidings, cheap power, light, water and other requisites are to be obtained in most centres. Homes for employees are made available in Winnipeg by Government housing loans providing 85 per cent of the necessary cost, the maximum loan being $4,500. Municipal improvements, schools, public utilities and other advantages follow in the progressive manner so evident throughout this new province. Climatic, health and cost-of-living conditions compare favourably with the best of Canadian or American cities. The initial cost of industrial and home sites in Manitoba is very moderate, building is reasonable, rents are not excessive and in smaller centres are low, and maintenance charges and taxes are quite reasonable.

Transportation Facilities.—In respect to transportation service Manitoba manufacturers are well situated. Winnipeg and St. Boniface have 27 lines of railways radiating in every direction, as well as steamboat service on the Red river. The Canadian Pacific Railway yards here have 303 miles of siding and are the largest individually-owned railway yards in the world. The Canadian National Railway yards are on the same gigantic scale. Brandon and Portage la Prairie have equally favourable, though less extensive, transportation facilities.

The market for manufactures in Western Canada is not only extensive, but is constantly growing. Goods manufactured in Manitoba have a distinct competitive advantage over those made in older countries. From the east, goods

must overcome a freight haul of a thousand miles; from the west, they must cross the Rocky mountains; while from the south they have the disadvantage of customs duties. Manitoba manufacturers are able to place their wares on the markets of the prairies without loss of time or excessive freight and customs tolls. They also secure the advantage of sentiment, for the west favours home production. In export trade, there is also much to be gained by having the raw material manufactured on the ground, paying shipping charges on the finished products only.

Growth of Manufacturing.—As an indication of the rapid growth of manufacturing in Manitoba it might be mentioned that in 1870, when the province was created, practically nothing was being manufactured commercially. In 1900 the total value of manufactured products was given by statisticians as about $13,000,000, while in 1918 it had increased to over $145,000,000, and in 1920 the city of Winnipeg alone claimed to have turned out over $120,000,000 worth of wares and to have had a pay-roll for the year of over $24,000,000. The following table has been compiled from figures published by the Dominion Bureau of Statistics in the *Canada Year Book* of 1920 and serves further to illustrate the extent of manufacturing in Manitoba:—

MANUFACTURES IN MANITOBA

Year	Establishments	Capital	Employees	Salaries and Wages	Cost of Materials	Value of Products
	No.	$	No.	$	$	$
1900[1]	324	7,539,691	5,219	2,419,549	7,955,549	12,927,439
1905	280	27,070,665	10,113	5,800,707	.....	27,857,396
1910	439	47,941,540	17,325	10,912,866	30,499,829	53,673,609
1915	499	94,690,750	.....	13,389,569	38,529,386	60,481,446
1917[2]	1,329	101,145,033	22,670	19,599,051	73,131,719	122,804,881
1918[2]	1,444	105,983,159	23,887	23,389,683	92,600,183	145,031,510

[1]Establishments employing five hands and over.
[2]All establishments.

For the Imperial Press Conference Canadian tour of 1920 the Winnipeg Board of Trade prepared an attractive little book of general information pertaining to the city and the province of Manitoba at large, from which the following extract and accompanying statement relating to the industrial situation of the province is taken:—

"Following is a partial list of industries doing business in Winnipeg. There are probably 100 additional establishments not coming under the Factories Act, making a total industrial army of approximately 32,000. With this list is incorporated an additional list of factories in the province of Manitoba, the products of which to a great extent are marketed through the city of Winnipeg."

INDUSTRIES IN WINNIPEG

Industrial Plants	Number of Firms	Number of Employees		Total
		Males	Females	
Abbattoirs and packing-houses	12	1,019	150	1,169
Breweries and bottling works	11	398	35	483
Creameries	9	419	20	439
Cleaning and dyeing establishments	20	72	30	102
Furniture manufacture (including caskets, beds, etc)	4	213	175	388
Flour and chopping mills and grain elevators	15	498	7	505
Food products (miscellaneous)	23	242	358	600
Garages and motor repair shops	39	397	22	419
Garment mfgr. (including furriers, making, etc.)	83	395	728	1,123
Laundries (steam)	19	149	408	557
Metal working	97	7,097	111	7,208
Printing, lithographing, etc	87	1,516	80	1,596
Stone, marble and glass manufacturers	14	152	2	154
Wood working	48	670	26	696
Wood and metal working	24	550	28	578
Inks and polishes	4	25	3	28
Paper box	4	44	133	177
Stables	4	24	.....	24
Power houses	16	188	.....	188
Water-works	6	38	.....	38
Brick plants	5	104	.....	104
Ice storage and manufacturers	2	85	.....	85
Gas works (various gases)	6	168	2	170
Paint shops	9	40	3	43
Vulcanizing	9	45	1	46
Auto top makers	3	14	10	24
Envelope and stationery factories	2	11	51	62
Tarring mills	2	30	1	31
Drug and sanitary supplies	17	77	148	225
Soap factories	2	68	22	90
Bag factories	4	82	276	358
Asphalt and paving plants	2	35	.....	35
Sand, gravel and crushed stone	2	10	.....	10
Pennant and regalia	2	2	5	7
Leather goods	10	86	9	95
Tents and awnings	4	17	63	80
Sporting goods and barbers' supplies	2	15	7	22
Storage battery manufacturers	7	33	5	38
Paint and linseed oil	4	86	14	100
Broom factories	5	29	2	31
Junk	4	19	6	25
Oil works	6	62	2	64
Artificial limbs	1	5	.....	5
Refrigeration and cold storage	3	39	.....	39
Optical goods	1	25	27	52
Upholstering and carpet sewing and cleaning	6	31	11	42
Photo finishing	2	6	54	60
Picture framing	3	13	1	14
Round houses	4	123	.....	123
Trunk and suit cases	2	10	2	12
Surgical and surveyors' instruments and supplies	2	7	7	14
Glove factories	2	31	83	114
Bicycle and typewriter repairs	10	52	11	63
Engraver	1	2	.....	2
Dental goods laboratory	1	4	2	6
Seed packing	1	20	8	28
Doll factory	1	10	.....	10
Press roller factory	1	5	.....	5
Total	689	15,607	3,149	18,756

INDUSTRIES IN WINNIPEG—*Concluded*

Industrial Plants	Number of Firms	Number of Employees		Total
		Males	Females	
*Industries outside Winnipeg and District**				
Creameries and cheese factories	16	36	3	39
Electric and acetylene light plants	15	52	2	54
Flour and chopping mills	27	188	2	190
Garages and motor repair shops	42	102	.....	102
Grain elevators	27	50	.....	50
Printers and publishers	26	89	18	107
Metal working	39	592	.....	592
Wood working	25	358	1	359
Wood and metal working	5	15	.....	15
Cement works	1	15	.....	15
Water works and pumping stations	6	13	4	17
Saddlery manufacture	1	24	1	25
Bakeries	9	31	6	37
Breweries and bottling works	5	36	1	37
Cigar factories	3	4	20	24
Marble works	2	10	.....	10
Dye works	1	2	.....	2
Laundries	5	13	39	52
Tanneries	1	2	2	4
Rock crushers	2	62	.....	62
Brick plants	5	33	.....	33
Lime plants	1	14	.....	14
Rice mills	1	1	.....	1
Total	265	1,742	99	1,841
Grand Total	954	17,349	3,248	20,597

*Supplied by Winnipeg Board of Trade.

Following are industrial statistics of three of the leading cities of the province for the years 1917, 1918 and 1919:—

INDUSTRIAL STATISTICS OF CITIES AND TOWNS HAVING 5,000 POPULATION AND OVER*

	Year	Establishments	Capital	Employees	Salaries and Wages	Cost of Materials	Value of Products
		No.	$	No.	$	$	$
Brandon	1917	63	3,865,691	738	660,405	2,386,972	4,615,713
	1918	65	4,224,592	711	718,025	3,611,875	5,346,633
	1919	85	4,704,000	805	1,024,014	3,748,409	5,881,380
St. Boniface	1917	29	1,353,719	793	297,951	1,756,493	2,851,612
	1918	30	1,828,946	556	516,442	1,889,342	3,693,128
	1919	44	2,345,526	708	754,068	2,385,551	3,711,413
Winnipeg	1917	676	88,556,837	18,111	15,729,178	58,495,921	98,101,632
	1918	779	82,709,029	19,181	18,773,622	77,689,693	118,154,995
	1919	876	80,378,258	23,175	24,122,564	70,155,501	119,836,108

*Preliminary report of Dominion Bureau of Statistics, 1919.

According to the same report the ten leading industries of the province in 1919 were as follows: Slaughtering and meat-packing, flour and grist milling, house-building, car repairing, butter and cheesemaking, manufacture of cotton bags, printing and publishing, plumbing and tinsmithing, bread and other baking, and bookbinding.

The Milling Industry

With an abundance of the world's highest grade hard wheat produced or marketed within its borders, plenty of cheap power available in its principal centres, adequate transportation facilities and a world-wide market, Manitoba has become a field of primary importance for the miller and flour dealer.

Milling operations in Manitoba date back over a century, when the early Selkirk colonists, after gathering their crop with the sickle and threshing out the wheat with the flail, ground the kernels into flour with handstones known as querns. A few of these querns are still in existence and are highly valued by their owners as antiques of more than passing interest. As may be readily surmised, the flour thus produced was not to be compared with the product of the scientifically constructed mills of to-day.

Early Milling.—The first millwright in the colony was sent out in 1813 by Lord Selkirk, who was ambitious to have his settlers produce enough flour for their own use as well as to meet the requirements of the Hudson's Bay Company. About 1823 the two-horse treadmill was introduced and a little later the Hudson's Bay Company erected a windmill at Fort Douglas. It developed sufficient power to work two pairs of stones, though much time was lost for want of a man who understood its operation. It finally commenced work in 1825 and was the first of several such windmills to grind flour in the colony. Until about the year 1831 the Hudson's Bay Company continued to import quantities of flour from England *via* the Hudson Bay route. A census of the Red River colony in 1849 placed the number of mills at 20 of which 2 were driven by water and 18 by wind.

For many years the quality of flour produced was very unsatisfactory. Three main causes were responsible for this, namely, the quality of the wheat itself was inferior, the methods of handling the grain were lax, and the milling processes of the day were crude. With the introduction of the Hard Red Fife, Marquis and other species to replace the softer and inferior varieties of early days the quality of wheat has risen and to-day Manitoba hard wheat is the acme of perfection and the cereal most eagerly sought by the milling companies of the world. Cutting, threshing, cleaning, shipping and storing facilities have improved to such an extent that the percentage of grain damaged is small compared with that of earlier days. The rigid grading system also ensures the miller receiving a better sample.

Advent of New Machinery.—Chief of all factors, however, in bringing laurels to the flour of Western Canada were the improvements made in the methods of milling during the years from 1870 to 1880. By the invention of new machinery and devices the wonderful baking qualities of hard spring wheat were disclosed, and the removal of fine bran substance was made possible. A whiteness of bread was thereby secured in place of the former dull colour. Western wheat and western flour then rapidly assumed their place as world leaders and to-day the name "Manitoba" as applied to flour signifies of the world's best.

To-day the flour-milling industry of Manitoba represents a capital investment of nearly ten million dollars and the daily capacity is over 15,000 barrels. The old stone method has almost disappeared, but 16 pairs being now reported in the province, and modern chilled steel rollers have supplanted them. Wind-

mills have also disappeared and power is now derived from steam or electricity. As a rule, the smaller mills use steam power and the larger mills located in the larger centres, use hydro-electric power.

Giant Modern Mills.—The capacity of the mills runs all the way from a 20-barrel grist mill in a small village to the great modern mills of the Western Canada Flour Mills, Limited, which are located in St. Boniface. These can turn out 5,500 barrels of flour every 24 hours. A recent report on the mills of Manitoba, including 31 flour mills, 4 oatmeal mills and 1 rye flour mill, placed 12 as having 24-hour capacities of less than 100 barrels; 6 at 100 barrels; 12 over 100 and under 500 barrels; 2 at 500 barrels; 1 at 600 barrels; 1 at 750 barrels (oatmeal); 1 at 3,000 barrels and 1 at 5,500 barrels per day. The Dominion Bureau of Statistics reported 44 plants in the year 1920 with a combined 24-hour capacity of 13,355 barrels. The mill equipment as shown on the same report showed 504 pairs of rollers and 16 pairs of stones.

Capital Invested.—The capital invested in the milling industry of Manitoba in 1920 was made up as follows: Land, buildings and machinery, $2,825,011; machinery and tools, $1,603,507; materials and stocks on hand, $916,530; cash and trading and operating accounts, $1,907,318; total, $7,252,366. These figures were published by the Dominion Bureau of Statistics for the year 1920 and are the latest available at the time of writing. As the industry has been steadily growing the estimate given in a preceding paragraph of $10,000,000 may be regarded as fairly conservative.

During the same year there were in operation in the whole of Canada 1,332 industrial plants representing a gross investment of $68,838,927. Over 7,085 persons were employed in these plants and their pay-roll for the year amounted to over $8,571,504. The total cost of materials used was $205,746,546 and the total value of products was $239,255,461. The figures for Manitoba alone were $23,834,742 and $27,235,314 respectively.

Manitoba's capital investment in the milling industry, according to the figures quoted for 1920 was 10·5 per cent of the investment for all Canada. The capacity of her mills was 9·9 per cent of the Canadian total. These figures illustrate to some degree the growth of the industry but must not be construed as representing its comparative possibilities. The possibilities of milling in Manitoba are hard to estimate. Millions of bushels of the highest grade wheat are passing through the province to feed the great mills of Eastern Canada, the United States, Europe and other foreign countries. Cheap power for driving the machinery of home mills is now being developed. United States exporters and European importers of flour are purchasing the surplus output and it is only logical to expect that greater quantities of cereals will be converted into milled products before being shipped to the ultimate consumer.

The Large Milling Companies.—Among the great milling companies of Canada which have plants in Manitoba may be mentioned the Lake of the Woods Milling Company, Limited, the Ogilvie Flour Mills Company, Limited, the Western Canada Flour Mills Company, Limited, and the Maple Leaf Milling Company, Limited. The head office of the Lake of the Woods Milling Company is at Montreal and the western office is at Winnipeg. Mills at Keewatin, Ontario; Portage la Prairie, Manitoba; and Medicine Hat, Alberta, have a combined capacity of 13,700 barrels daily, that at Portage la Prairie accounting for 1,500 barrels. Wheat is received at 112 country elevators in the Prairie Provinces having combined capacities of 3,500,000 bushels. Terminal mill elevators hold an additional 1,500 bushels.

The head office of the Ogilvie Flour Mills Company is also at Montreal and mills having a total capacity of 22,250 barrels daily are located at Montreal; Fort William, Ontario; Winnipeg, Manitoba, and at Medicine Hat, Alberta.

Warehouse capacity is provided for 377,000 barrels of flour and elevator capacity for 10,335,000 bushels of wheat. The Winnipeg plant has a daily capacity of 3,000 barrels of flour and 755 barrels of oatmeal.

The Western Canada Flour Mills Company has its head office in Toronto, Ontario, with plants in Ontario, the Prairie Provinces and on Vancouver island. The total daily capacity of its mills is 10,000 barrels of flour and 800 barrels of oatmeal and rolled oats. The Winnipeg plant, located in St. Boniface, has a daily capacity of 5,500 barrels of flour and another plant in Brandon turns out daily 600 barrels of flour and 200 barrels of oatmeal. Over 100 elevators on the prairies receive and forward material for these plants.

The head offices of the Maple Leaf Milling Company, Limited, are also located at Toronto. This company has several plants in Ontario and one in Manitoba, located at Brandon. The total daily capacity of its mills is 24,500 barrels, of which 15,000 are accounted for by the gigantic plant located near the Government elevator at Port Colborne, Ontario. This mill is the largest in the British Empire. It is visited by great numbers of travellers from all parts of the world and is famous for its modern scientific equipment. The Maple Leaf Milling Company claims the distinction of having supplied more flour to the allied armies during the Great War than any other mill. The Brandon plant is small in comparison with that at Port Colborne, having a capacity of but 350 barrels daily.

The following mills having capacities of 300 barrels per day or over may also be mentioned; Turtle Mountain Milling Company, 300-barrel steam mill at Boissevain; Northland Milling Company, Limited, 550-barrel steam mill at Oak Lake; Premier Grain Elevator and Milling Company, Limited, 300-barrel steam mill at Portage la Prairie, and George McCulloch and Sons, 500-barrel steam mill at Souris.

Oat Meal Mills.—Oats of the very finest quality are produced in Manitoba. The kernels are exceptionally plump, sound and heavy. The milling of this cereal is on the increase. In addition to the plants already referred to may be mentioned a 300-barrel mill at Neepawa owned by the Quaker Oats Company and a 150-barrel mill at Portage la Prairie operated by the Metcalfe Milling Company, Limited. Rye flour is also made in Winnipeg, the electrically-driven mills of the B. B. Ryan Flour Mills, Limited, having a daily capacity of 255 barrels.

The milling industry is firmly established in Manitoba. Owing to the increased settlement of the west and the more intensive methods of agriculture now being practised a greater local demand is created for both milled products and by-products, and the great export trade that Canada has established absorbs all surplus. From 1906 to 1919 Canada's export of flour increased in round numbers from 900,000 barrels to over 9,000,000 barrels, or 1,000 per cent in 13 years. It is also interesting to note that 91·5 per cent of the stocks, bonds and other securities of incorporated and joint stock companies in the flour and cereal milling industry of Canada is owned in Canada. Of the balance 3·8 per cent is owned in the United Kingdom, 3·2 in the United States and 1·5 in other countries.

Meat Packing

The live-stock production of the Prairie Provinces is considerable and can be rapidly increased to meet much greater demands. Like the grain business, the live-stock business is centralized in Winnipeg, the great stockyards at St. Boniface representing the funnel. Local packing plants absorb but a small proportion of the stock received and, as with grain, the greater part of this production is shipped out of the province. There is a wide field at St. Boniface for meat industries of every description.

According to the Census of Industries for the year 1920, as published by the Dominion Bureau of Statistics, there were in that year in Manitoba some eight plants engaged in the meat industry. They represented a capital investment of $6,842,063, made up of lands, buildings, and fixtures valued at $1,241,999; machinery and tools valued at $588,475; materials on hand and stocks in process worth $3,187,284, and cash, trading and operating accounts and other items to the amount of $1,824,305. Some 1,264 persons were employed in this industry, the salaries and wages paid during the year amounting to $1,832,610. The cost of the year's materials was $17,043,948 and the value of the output was $26,822,930.

During the same year, 86 plants were operated in the whole of Canada, the value of their total production being $240,544,618. Manitoba's output was thus about one-ninth of the whole. It exceeded that of Alberta by about $3,500,000 and fell below that of Quebec by about $2,650,000. Ontario's output exceeded the combined output of all the rest of Canada. During this year the total value of meat exported was $50,738,485, but Canada imported at the same time meats worth over $10,000,000. From these figures it would appear that Manitoba might logically expect a large growth in the meat industry.

Lumbering

The lumbering industry in Manitoba, while not to be compared with that of British Columbia, Quebec or Ontario, is nevertheless of no mean proportions. There is no pulp and paper manufactured as yet. Lumbering in Manitoba, especially the logging operations, occupies a sphere of unusual importance in the economic development of a new country by the employment it affords to homesteaders and farmers with their teams during the winter months.

During the year 1920 the number of logging operations were reported as being 16 while some 40 sawmills converted the cuts into lumber, laths and shingles. According to figures supplied by the Dominion Bureau of Statistics the capital invested in that industry in 1920 was $3,804,564. Of this amount, $249,851 was invested in logging plants, $1,821,467 in mills, materials on hand and stocks in process accounted for $1,196,576 and the balance, $536,670, was made up of cash and trading and operating accounts. The capital invested in the lumbering industry in all Canada for the same year was $234,793,646. Manitoba's investment represented a little more than 1½ per cent of the total.

The value of sawn lumber by species for the year 1920 is reported as follows: Spruce, $1,981,396; poplar, $36.274; jackpine, $17,530; birch, $12,900; tamarack, $10,140; balsam fir, $350; total, $2,058,590. In addition, shingles were cut to the value of $475 and laths valued at $52,720, giving a total output for the year of finished material to the value of $2,101,785.

In logging operations, 779 persons were employed and the salaries and wages paid them amounted to $568,118. In the saw-mill operations, the employees of all grades numbered 644 with a total remuneration of $690,327. Compared with the whole of Canada, this represents a proportion in keeping with the investment, namely, approximately 1½ per cent. As pointed out in the section dealing with forest resources there is undobutedly a future in Manitoba for the commercial practice of scientific forestry and the lumber, pulp and general wood products industry will expand in proportion to the progress and success attained by such efforts.

Mining

Non-Metallic Minerals.—Mining is another industry that is developing rapidly in Manitoba. For many years several non-metallic and structural materials have been exploited, but only in recent years have metallic ores been

mined. The manufacturing of brick, tile and cement has attained considerable proportions. Gypsum has been recovered in large quantities. The beautiful limestone, known as Tyndall stone, has attained world fame as a building material of more than usual attractiveness and has been extensively exported as well as used locally for many years. Quarries and brick, cement and plaster works have accounted for nearly all Manitoba's mineral output to date.

New Gold and Copper Fields.—In the recently discovered mineral fields north of Saskatchewan river and east of lake Winnipeg, the extensive mining of metallic ores containing gold, silver, copper and other metals may shortly be expected. Considerable ore from the Mandy copper claim was shipped to a smelter in British Columbia at high transportation costs and still netted a good profit. Such methods, however, cannot be economically practised with the extensive bodies of lower grade ore known to exist in the vicinity of the Mandy. The performance whetted the desire of large numbers of prospectors and mining enthusiasts for the establishment of a local smelter and hopes are entertained that this may be accomplished. In the meantime a few stamp or ball mills are being installed in the most promising gold fields and their performances are being keenly watched.

Though perhaps too early to predict the probabilities of metal mining, it is safe to state that, from discoveries made and results already attained, the field is one worthy of the most serious attention of prospector, miner and capitalist. That the province is about to enter upon an era of active mining is freely predicted by men who are in the best position to know.

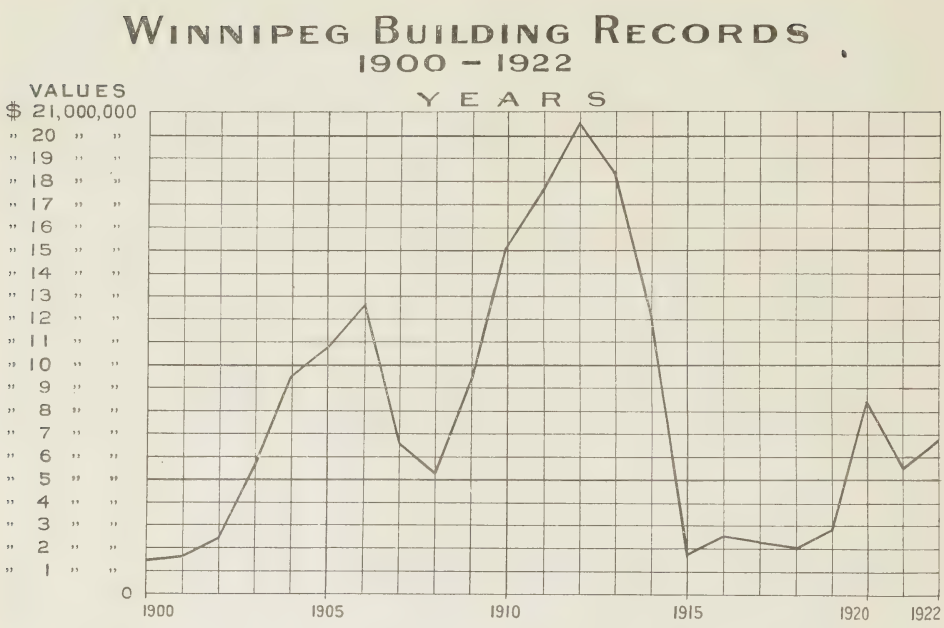
Miscellaneous Industries

Though the automobile is extensively used in Manitoba, there having been 40,430 cars registered in 1921, the automobile industry is confined to supplies and repairs. For the year 1920 the value of the former was given by the Dominion Bureau of Statistics as $160,536 and the latter at $1,094,511, a total of but little over a million and a quarter. For the same period the total automobile business of Canada reached a value of $137,000,000. The number of supply houses in Manitoba in 1920 was 5 and that of repair establishments was 160. About 400 persons were engaged in the industry, the supply houses accounting for 36 and the repair establishments for the remainder.

Building and Construction.—The building and construction industry in Manitoba has fluctuated from year to year according to the general prosperity of the people, the requirements of incoming settlers and the rise and fall of the financial barometer. Great building booms followed the advent of the railway and were succeeded by periods of severe reaction. The early years of the twentieth century witnessed a boom in railway construction accompanied by tremendous strides in building which attained a peak about the year 1912. The outbreak of war had a most disastrous effect on these industries and only during the past two years have they begun to approach normal.

Railway building is still practically at a standstill but highway construction is rapidly progressing. Cities and towns are again making permanent improvements on a large scale. Waterpower development and the construction of hydro-electric power transmission lines are receiving more attention than ever before. Reclamation schemes are being investigated, new territories are being opened and generally speaking, the building and construction industry is again on its feet. Its revival is characterized by an evidence of less haste but greater solidity and permanency.

The building records of the city of Winnipeg for the period from 1900 to 1922 may be used as an illustration of the variations mentioned.



Printing and Publishing.—The printing and publishing business has been developed probably to a greater comparative degree than any other in the province. Winnipeg perhaps publishes a greater number of periodicals in a greater variety of languages, than any other city in Canada or any of equal population in America. It issues two daily newspapers, the *Free Press* and the *Tribune,* that rank with leading dailies anywhere on the continent.

The *Grain Growers Guide* published by United Grain Growers, Limited, has the largest circulation of any agricultural paper in the West, while numerous trade journals and organs of every description make this city the press centre of Western Canada.

Brandon and Portage la Prairie also publish daily newspapers, while practically every town of any pretence has its local weekly. The daily papers of Manitoba receive the current news of the day by telegraph and are able to serve the smaller towns and adjacent rural sections to greater advantage than the papers published in distant centres. The enterprise, achievement and tone of the press of Manitoba is on a par with that of any of the older provinces. Both the *Free Press* and *Tribune* of Winnipeg have installed powerful radio broadcasting stations and give daily news service and concerts that are being received in every part of the province as well as farther afield.

Among other industries that appear to be on the eve of development in Manitoba may be mentioned fur-farming, oil production, peat-making, glass works, canning, chemical works, pulp and paper making and the more intensive and extensive utilization of such products as raw furs, hides, wool, flax and hemp.

Labour*

Cost of Living.—Up to 1914 prices of food and most commodities were higher in the Prairie Provinces than in Ontario and Quebec, but by 1918 prices of food rose somewhat more in the East than in the West where food production

* Information supplied by the Department of Labour, Ottawa.

greatly increased, with the result that food prices in Manitoba have, in recent years, averaged about the same as throughout the Dominion. For April, 1922, the food budget compiled by the Federal Department of Labour averaged $10.41 for Manitoba, as compared with $10.54 for the Dominion and $10.39 for Ontario.

Owing to the cold climate and high price of coal, the fuel question has been a serious problem in Manitoba, but during recent years mining development in the bituminous and lignite coal areas of Alberta has rendered this fuel available in Winnipeg at prices which make it a valuable substitute, not only for anthracite coal, but for bituminous coal from the United States. Anthracite coal was $20.50 per ton, but bituminous coal extensively used in recent years was $13.75.

Some shortage of houses has been experienced in Winnipeg during recent years and rentals have risen considerably, six-roomed workingmen's houses being up to between $25 and $50 per month according to location and the conveniences installed.

The following table gives the average retail prices of important staple commodities in Winnipeg during the spring of 1922:—

RETAIL PRICES IN WINNIPEG

Sirloin steak	28c. per pound
Round steak	21c. "
Rib roast	20c. "
Shoulder roast	13½c. "
Stewing beef	10c. "
Mutton— leg roast	26c. "
Lamb	32c. "
Pork roasting	29c. "
Pork, chops	36c. "
Bacon, breakfast	42-47c. "
Whitefish, fresh	15c. "
Cod, steak, fresh	18-20c. "
Halibut, fresh	25-35c. "
Eggs	28-30c. per dozen
Butter, creamery	45c. per pound
Cheese	30c. "
Milk	12c. per quart
Bread	7c. per pound
Flour	4- 6c. "
Rice	7-12½c. "
Canned, corn and tomatoes	18-20c. per tin
Potatoes	$1 20c. per bag
Prunes, medium size	20c. per pound
Jam	$1 00c. per 4-lb. tin
Canned peaches, pears and plums	27-35c. per 2-lb. tin
Sugar	8½c. per pound

Wages.—Wages are somewhat higher in Manitoba than in localities of the same size farther east and the eight-hour working day prevails to a great extent.

The following table shows the wages of typical trades in the cities of Winnipeg and Brandon at the end of 1921:—

WAGES IN WINNIPEG AND BRANDON

Bricklayers	$1 15 per hour
Carpenters	90c. "
Painters	81c. "
Plumbers	$1 00 "
Builders labourers	50-55c. "
Blacksmiths	65-80c. "
Sheet-metal workers	60-82½c. "
Electricians	77½c. "
Machinists	65-72c. "
Civic labourers	50-60c. "
Common labour in factories	40-55c. "
Street railway conductors	60c "
Street railway motorman	60c "
Printers	$36.00-44.00 per week of 44-48 hours.

Labour Organization.—In Manitoba, as in other parts of the Dominion, trade unions are for the most part organized on international lines and affiliated with the parent bodies in the United States. A number of unions are affiliated with the One Big Union, an organization of a somewhat extreme type and opposed to trade unionism as ordinarily practised in Canada.

According to the latest returns of the Department of Labour, there are in Manitoba 141 local trade unions operating under the craft system of organization, 124 of which have international affiliation, while 11 are branches of non-international organizations, and six are independent bodies. There are also 18 units of the One Big Union. The labour body with the largest number of members in the province is the United Brotherhood of Maintenance-of-Way Employees and Railroad Shop Labourers, which has 16 local lodges, the Brotherhood of Railroad Trainmen and the Canadian Brotherhood of Railroad Employees standing second with 11 branches each. The reported membership of 95 of the 141 craft unions in Manitoba is 10,316. The city of Winnipeg has most of the trade union membership, having 77 local branches, 53 of which reported 7,743 members. Brandon has 25 local branches, 16 reporting 930 members. The exact membership of the One Big Union is not known, but it is understood that the organization has about 3,000 members in the province, Winnipeg with 17 units having the bulk of the adherents.

The Labour party in Manitoba is represented in the legislature by eleven members and has also one representative in the Federal House. Three of the successful candidates for the local legislature in the constituency of Winnipeg were among those convicted on the charge of seditious conspiracy in connection with the Winnipeg general strike in 1919 and were serving their sentence during the election campaign.

Two publications devoted to labour interests are published in Manitoba, namely, *The Western Labour News* and the *One Big Union Bulletin,* both published at Winnipeg.

Industrial Disputes.—The relations between labour and capital in Manitoba have, on the whole, been amicable, and the record maintained by the Department of Labour shows comparatively few industrial disputes in the province during the past five years. These disputes, too, for the most part were unimportant, with one exception, however, namely, the large industrial difficulty which arose in the city of Winnipeg in the spring of 1919 following

strikes in the metal trades and building trades and which became the most serious disturbance in the industrial history of Canada owing, not only to the seriousness of the situation in Winnipeg, but to the extension of the difficulty through sympathetic strikes which became prevalent in western cities and in western coal mines. The disturbance affected approximately 35,000 workers in Manitoba during the months of May and June. The dispute was finally adjusted at the end of June.

The general strike in Winnipeg was associated closely in the public mind with the One Big Union, and during the strike a number of officers or associates of this organization were arrested and sentenced to various terms for seditious conspiracy. Since the Winnipeg difficulty, however, at which time the One Big Union claimed a membership of over 40,000 persons, the membership of this organization, the principles of which are opposed to those of trades unionism as commonly practised in Canada, has fallen to about 3,000 in Manitoba, and has also decreased in the other provinces where it had established some slight hold, a large number of organizations having broken away and become affiliated again with the international associations to which they formerly belonged.

Employment Service.—The Employment Service of Canada, the result of an Act passed in 1918 to assist in the problem of demobilization, was expanded to meet the conditions of unemployment which followed the financial depression which became marked in Canada as in other countries shortly after the conclusion of the war.

The Act is designed as a mechanism to correlate the demand for and availability of labour throughout Canada. The scheme is partly financed by the provinces and partly by the Dominion, but is directly under the administrative control of the provincial governments. From these offices, linked together by provincial and interprovincial clearing houses, employer and employee are placed in direct communication with one another, and general information relative to employment and labour is supplied to anyone interested. The service includes a system of cheap transportation, whereby labour may be transferred to such points as required, not only within the province but also interprovincially. There is no charge in connection with the placement of employees.

The Employment Service has nine local employment offices in the province of Manitoba. Six of these offices are located in Winnipeg and the others in Brandon, Dauphin, and Portage la Prairie. Winnipeg is the distribution point for harvest labour during harvest excursions from the east, special offices being opened at the railway stations during the harvest excursion period. Manitoba is the only province having a special office for the placement of juveniles.

Vocational Education in Manitoba.—Until recently, vocational education in Manitoba was almost wholly confined to agricultural training, domestic science for girls, and commercial work in the academic high schools. The agricultural work, which has reached an advanced stage of development, is assisted by annual grants from the Federal Government amounting to approximately $77,000. This money is granted to the Provincial Government under the terms of the Agricultural Instruction Act for the purpose of promoting agricultural instruction during a ten-year period commencing in 1913.

In 1919 the Dominion Government passed the Technical Education Act, which provides for grants on vocational education in urban centres. Under this Act, which is administered by the Federal Department of Labour, the Provincial Government receives annually, for ten years, an amount equal to one-half of its expenditures on industrial, commercial and home economics training, which are not supplemental by grants under the Agricultural Instruction Act. This additional assistance has stimulated the development of the work to such an extent that the federal grants have increased from $9,916.49 for the two years

ended March 31 1921, to $21,173.93 for the year ended March 30, 1922. The total annual expenditures on this work in the province exceed $150,000.

Vocational training in day schools is provided by nine cities and towns, and evening classes are conducted in Winnipeg and Transcona. The subjects taught include all branches of office work and homemaking and the fundamentals of mechanics, metal-working, woodworking, electricity, and draughting. The industrial training is not intended to qualify boys for entrance into the skilled trades but rather to provide a foundation of industrial knowledge and to assist the student in selecting the most suitable life work; 5,765 students were enrolled in these classes during the year and the attendance is rapidly increasing.

Labour Legislation.—Legislation in Manitoba regarding workmen's compensation is mainly along the lines of that in other provinces. The Manitoba Workmen's Compensation Act of 1920, as amended in 1921, provides for a system of exclusive state insurance. A direct assessment is made on the payrolls of all employers within the scope of the Act, the exceptions being outworkers and persons engaged in purely clerical work and not exposed to the hazard of the industry. Employers receive due notice of the amounts at which their industry is assessed.

Workmen's Compensation.—In cases of fatalities to workers, an allowance of $150 is made to cover burial expenses and the widow is given a pension of $30 a month, with $7.50 for each child under the age of 16 years. For orphans the monthly allowance is $15. Where permanent total disability results from an injury the compensation allowance is 66⅔ per cent of average earnings, and for permanent partial disability the allowance is 66⅔ per cent of the difference between average earnings before and after accident. For temporary total disability the injured worker receives for the period of disability 66⅔ per cent of his average earnings, and for temporary partial disability he receives for the same limited period 66⅔ per cent of the difference in his earnings before and after disability. The Workmen's Compensation Board may require employers in any industry to maintain first aid appliances as approved.

Factories Act.—The Manitoba Factories Act as subsequently amended, applies to practically all workshops where three or more persons are engaged. Women and children employed at home, where mechanical power is not used, are exempted. The age limit for the employment of children is 14 for boys and 15 for girls. Employers must, however, obtain and have on file certificates as to age, etc., respecting all employees under 16.

The Act contains the usual regulations respecting employees. Women or children may not be employed for more than 9 hours in one day or 54 hours in the week, unless hours of work are specially arranged through the week for the sole purpose of giving a short day on Saturday. Longer hours may, however, be observed in exceptional circumstances, e.g., in case of accident. An hour for lunch must be allowed to the same classes of worker. The inspector may decide whether women or children may take their meals in their workroom, or whether the employer shall provide a room for this purpose. Stringent provisions are made to ensure the safety and health of the workers in factories.

Minimum Wages.—A law respecting minimum wages provides for the fixing of standard minimum wages, and standard hours of employment, and standard conditions of labour for female workers employed in shops, factories and mail order houses in the cities in the province. The Act creates a minimum wage board composed of two representatives of employers, one of whom shall be a female, two representatives of employees, one of whom shall be a female, and one disinterested person as chairman. The board is authorized to make all

necessary orders relative to standardization of minimum wages, hours of employment, and conditions of labour. Orders which have been issued by these boards cover practically all industrial plants in which women are employed to any extent, besides places of amusement, shops, and stores, restaurants and offices. They provide minimum scales varying, for experienced adults, from $11 to $12.50 per week, and for inexperienced adults and minors, according to the length of the learning period already served.

Settling Industrial Disputes.—The Industrial Conditions Act provides machinery for the adjustment of industrial disputes by the establishment of a joint council of industry, to consist of one impartial chairman, two representatives of employers and two representatives of employees engaged in industry in the province. This council is empowered to make investigations into cost of living, the number of persons employed in industry, the wages paid, conditions of employment, housing, sanitary, home conditions, etc.

In addition to the foregoing, Manitoba also possesses a number of other measures designed for the protection of workers, amongst which may be mentioned Acts regarding (1) the employment of women by Orientals; (2) the assignment of wages; (3) inspection and regulation of bakeshops; (4) protection of wages of employees of building contractors; (5) liability of employers for the maintenance of employees in hospitals; (6) the employment of children in street trades, night-work, and injurious occupations; (7) the liability of contractors for employees' wages; (8) the earnings of minors—suits for wages; (9) apprenticeship; (10) Sunday labour; (11) earnings of married women; (12) inspection and regulation of mines; (13) regulations respecting hours of labour and employment of women and children in shops; (14) the protection of employees on buildings; (15) inspection of steam boilers; (16) the payment of fair wages to employees on public works.

CHAPTER IX

Commerce and Finance

BEFORE the cereal products of the land reach the baker or the housewife in their respective forms of flour, oatmeal or other milled or prepared substances, they have passed through three distinct phases of production. To two of these reference has already been made, namely, the actual growing or production of the cereals by the agriculturalist, and the conversion into the finished products mentioned, by the miller. Between the farmer and the miller, however, is a distinct and unique phase in the process of distribution that is of more than passing interest.

The Grain Business

In countries where but little grain is grown, where it is held longer and marketed more leisurely by the producer, where local millers are the chief purchasers, and consequently export of unmilled grain is limited, this phase is of minor significance. In Manitoba, however, it is accentuated by the peculiar conditions prevailing. An immense quantity of grain for export is produced; it is thrown on the market like an avalanche as soon as threshing operations are under way; and its movement towards the ultimate consumer is hastened by reason of great distances involved and a short open season. The buying and selling of this large quantity of grain and its grading, cleaning and sorting, loading and shipping, involves transactions in finance and transportation of gigantic proportions and feverish haste.

Transactions commence when the farmer arrives at his local railway station with a load of freshly-threshed grain and is met by the grain buyer. In earlier years buyers received their grain in flat warehouses. These were built along the railway sidings to facilitate the loading of cars and were laid out with a main central passageway and a series of bins partitioned off on either side. Farmers brought their grain to the warehouses in sacks and it was unloaded by hand and removed to its proper bin by warehouse trucks or push carts. In loading a car the warehouse man once more had to man-handle the grain. The tremendous increase in the production of grain soon made necessary a more expeditious method and the old flat warehouse in Manitoba has given way to the more efficient elevator which first made its appearance about the year 1880.

The Grain Elevator.—As suggested by the name the grain is "elevated" in the new style warehouse, machinery being utilized to raise it to a height above the bins into which it is allowed to flow under control. Rows of these tall, sentinel-like structures along special sidings at every railway station throughout the western farming areas are familiar sights to the traveller in these provinces and objects of peculiar interest to the newcomer.

Grain is now delivered to these elevators either in sacks or in bulk by the farmers. Wagons, drawn by two, or sometimes four horses, with specially constructed grain boxes, bring from 60 to 100 bushels at a trip. The wagon is driven to a platform scale and the gross load is weighed. The grain is then dumped into a hopper below the wagon, the empty wagon is weighed and the net weight of grain arrived at. Conveyors then elevate the grain into the desired bin, power for driving the machinery usually being derived from a stationary gas engine. The receiving of the grain is thus simplified as well as its loading into a car. The elevation of the grain into a shipping bin enables the operator to take advantage of the flowing qualities of grain and the action of gravity.

With a system of spouts he has only to let loose the contents of this bin and direct its flow into a car on the elevator siding below. A car may be thus loaded in about twenty minutes. These elevators are known as country elevators.

Loading Platforms.—Considerable dissatisfaction spread among farmers concerning the operation of the elevators and a demand was made for the privilege of shipping grain direct in carload lots without the intervention of the elevators. This gave rise to a system of

COUNTRY ELEVATORS AT RAILWAY STATIONS

From the farm the grain is delivered to these elevators or loaded directly into cars for shipment.

loading platforms, which railway companies are now compelled to provide at stations where there is sufficient demand. Under this method the farmer makes application for a car, which is placed at his disposal alongside the platform, and he is given a certain time in which to load it. His grain is then hauled on the platform and shovelled by hand into the car. The use of the platform, as may be readily understood, is restricted to those farmers living within easy reach of the station and to those who have sufficient grain to make up a car lot.

If the farmer sells his grain outright to the elevator company it is known as street grain. He may, however, have it placed in the elevator in a special bin which he can hire, in which case it is known as special binned grain, or he may store it with other grain of the same quality. In either case he arranged for a car and has the elevator company load the car for him, paying them storage and loading charges. When his car is loaded either from the elevator or from the loading platform he may sell it on the spot as track grain or ship it consigned on commission.

Shipping the Grain.—Box cars are used for carrying grain, which is loaded in bulk. Their capacity ranges from 60,000 pounds to 90,000 pounds, which, in the case of wheat, is equivalent to 1,000 to 1,600 bushels. Greater quantities of the lighter grains may be carried. The average car will carry 1,500 bushels of wheat, 2,000 of

oats, 1,400 of barley, 1,070 of flax or 1,250 bushels of rye. The cars are provided with inner doors reaching up to the loading line, a space being left between the grain and the roof of the car to allow the loaders and inspectors room for movement. The outer doors are closed and sealed before shipping and the car's identity kept by means of its number.

Winnipeg, the "Funnel."—Practically all the grain exported from Manitoba and most of that from Saskatchewan and Alberta is shipped eastward.* As the railways of the prairies converge at Winnipeg, this city, by reason of its strategic location, becomes the funnel of the grain movement. Though the grain continues by rail some 425 miles farther to the head of lake navigation at Fort William and Port Arthur, the intervening country is not an agricultural one, and Winnipeg thus loses none of its mobilization advantages. Being nearer the fields of production it has the advantage of closer communication and has thus become the greatest grain-trading centre on the North American continent.

Government Regulation.—As the grain business in Western Canada grew in volume it became necessary for the Federal Government to enact various forms of legislation regulating it. These were finally consolidated and embodied in "The Canada Grain Act" of 1912. The Act created a Board of Grain Commissioners for its administration and laid down certain rules, principles and standards pertaining to the buying and selling, weighing and grading, loading and shipping, and generally the performance of all transactions pertaining to the grain trade. It established statutory grades of grain, provided for the regulation of the operation of elevators, the hearing and investigation of complaints, and generally aimed to guarantee to the grain grower, as far as possible, fair dealings in the disposal of his products.

The Canada Grain Act defines various grades of grain by which value may be adjudged, and various general classes depending on its condition. The value of wheat, for instance, depends on many factors which may influence its milling and baking qualities. The kernels may be sound and plump but with the wheat may be admixtures of foreign or weed seeds or other cereals; the kernels may be diseased by rust or smut; they may be shrunken by frost; the wheat may be dirty, heated, bin-burnt or damp; the colour and hardness of the kernels may vary; or other defects may be found which detract from its value. The determining of a proper category for a quantity of grain is known as grading it. Certain statutory grades are fixed by the Canada Grain Act which are constant and do not vary from year to year and the Board of Grain Commissioners is empowered to set other commercial grades from year to year depending on prevailing conditions.

Grades of Wheat.—In Manitoba there are four statutory grades for spring wheat, namely, No. 1 Hard, No. 1 Northern, No. 2 Northern, and No. 3 Northern. There are also statutory grades for oats, barley, rye and flax. To be graded No. 1 Hard, wheat must be sound and well cleaned, weighing not less than 60 pounds to the bushel, and must be composed of at least 75 per cent of Hard Red Fife or Marquis. No. 1 Northern differs only in that the percentage of Hard Red Fife or Marquis required is reduced to 60. No. 2 Northern calls for wheat sound and reasonably clean, of good milling quality and fit for warehousing, weighing not less than 58 pounds to the bushel, and composed of at least 45 per cent of Hard Red Fife or Marquis. Wheat not good enough to be graded No. 2 Northern may be graded No. 3 Northern at the discretion of the inspector.

* In 1921 and 1922 the movement of grain especially from Alberta and western Saskatchewan to European markets via Vancouver and the Panama canal began to assume considerable proportions.

The Western Grain Standards Board defines the commercial or lower grades. It has set three additional grades for wheat, namely, No. 4 Northern, No. 5 Northern and No. 6 Northern. There are thus seven principal grades of western hard red spring wheat, as well as grades of winter wheat and other cereals. Each of these grades is subject to further divisions according to the condition of the grain or the general class into which it falls.

The Canadian Grain Act divides grain into five general classes as follows: Statutory grades, commercial grades, rejected grain, condemned grain, and no grade. The statutory grades include the grains of highest quality and the commercial grades that of more varied quality. "Rejected grain" means all grain that is unsound, musty, dirty, smutty, or sprouted, or that contains a large admixture of other kinds of grain, seeds or wild oats, or that from any other cause is unfit to be classed under any of the recognized grades. "Condemned grain" means all grain that is in a heating condition or that is badly bin-burnt, whatever grade it might otherwise be. "No grade" means good grain that has an excessive moisture, being tough, damp or wet, or otherwise unfit for warehousing.

Wheat of any of the six grades of Northern may also fall under any of the various classes, thus giving rise to a fresh variety of grades. In a single year there have been in Western Canada as many as thirty-one grades of Western spring wheat, and thirty grades of winter wheat, thirty grades of oats, fifteen of barley and fifteen of flax. The highest grade of grain, of course, commands the highest price, and with each lowering of grade there is a corresponding lowering of price. The producer naturally enlarges on the good qualities of his grain and demands the highest grading he feels it entitled to; the consumer has a keen scent for its failings and aims to secure the lowest grading possible; hence the fixing of the grade becomes a delicate task and one requiring great skill as on it depends the price at which the grain will be sold. It is also important that the grading be uniform as all grain belonging to any particular grade, on reaching the great terminal elevators, will probably become mixed.

Inspection Staff.—The inspection and grading is done by a staff of Government experts under the provisions of the Canada Grain Act. There is a chief inspector for the whole Dominion, which is divided into two inspectorates, the Western Inspection division, extending from the Great Lakes to the Pacific coast, and the Eastern Inspection division, extending from the Great Lakes to the Atlantic coast. Headquarters for the Western division are located at Winnipeg, where most of the work is done. Other inspections, however, are made at Calgary, Moose Jaw, Saskatoon, Fort William, Port Arthur, and Duluth. The importance of uniformity in grading, and the impossibility of maintaining stations at every shipping point, makes the centralization of the work advantageous, and as Winnipeg is a point of unusual vantage the inspection of the bulk of western grain is done there.

The Winnipeg Inspection offices are located in the Grain Exchange building and during the busy season the inspection is carried on with great despatch. Train loads of grain are constantly arriving for the elevators at the head of the Great Lakes. As soon as a train arrives gangs of men are set to work to secure samples from every car and take them to the inspection rooms. Great care must be exercised in securing true samples and in keeping accurate record of the car from which each is taken. An official breaks the seal of a car door, a sampler enters and by means of an instrument commonly known as a stabber secures from seventy-five to one hundred samples from every part of the car, another official receives them in a little bag with a card containing the necessary information and a sealer again seals up the door. A good gang can secure samples from a train of forty-five cars in about an hour.

The samples are then taken to the inspection office where a clerical staff make out information sheets for each sample, passing the samples on to the inspectors under identification numbers only, so that the inspectors do not know whose grain they are sampling. The weight of the grain per bushel is determined by the inspectors, the admixture of weed seeds estimated, this being known as setting the dockage, the moisture contents ascertained and other factors noted. The grade is finally arrived at and recorded, after which the clerical staff prepare a certificate on which the car represented is sold. Though most western grain is sold by grade, selling by sample is not prohibited. Provision has been made for the establishing of sample markets at Winnipeg, Fort William and Calgary.

Meanwhile the car is proceeding on its way to Fort William or Port Arthur, but as the freight trains move somewhat slowly the inspection office is able to get a report by express to the terminal office in advance. This permits of the car being emptied immediately upon its arrival into the proper bin, as all grain of the same grade may now be mixed. It also advises regarding any car which for certain reasons, such as overloading, could not be inspected, or in case a re-inspection is required. If the owner of a car is not satisfied with the grade given he may call for a re-inspection which is made without extra charge at the terminal. If still dissatisfied an appeal may be made to a survey board. If no change is made the charge for this is three dollars, but if the grade is raised there is no charge.

When the grain is finally received in the terminal storage elevators it is weighed under the supervision of a chief weighmaster, who has charge of all the weighing under the Board of Grain Commissioners. Though the scales at country elevators are inspected by Government officials and the law provides for the shipper having access to the weighing room, it is at the terminal elevator that the final weight is adjusted. The grain, being weighed, then loses its identity and the shipper receives a certificate crediting him with a certain weight of a certain grade of grain. This is negotiable collateral on which future sales are made.

Terminal Elevators.—Terminal elevators are few in number compared with country elevators, but they are of immense size. At Fort William and Port Arthur there are thirty terminal elevators having a combined capacity of 54,685,000 bushels of grain. The name "terminal," however, is not applied in its usual sense as indicating the end of the rail haul. There are interior terminal elevators as well as those where the grain is transferred from rail to water. In Manitoba there is a huge terminal elevator at Transcona, while others are located at Saskatoon and Moose Jaw, in Saskatchewan; at Calgary, in Alberta; and at Vancouver in British Columbia. A terminal elevator is one where the grain is stored in bulk according to grade after all details of inspection and weighing are completed. From it the grain is shipped in huge consignments to distant markets.

The Grain Fleet.—On the Great Lakes there now operates a fleet of especially constructed grain-carrying boats. The carrying capacity of these boats is enormous and the speed at which they are loaded from the terminal elevators is astonishing. A single boat will carry three hundred cars, or seven train loads of grain. Lying alongside the huge terminal elevators, which are built at the water's edge at Fort William and Port Arthur, they are loaded at the rate of 75,000 or 100,000 bushels per hour. The Lake Shippers' Clearance Association has been formed as a voluntary organization to facilitate the grain shipping business on these lakes. Considerable western grain is now beginning to find its way to Europe by way of Vancouver and the Panama Canal.

There are also a few elevators known as hospital elevators, which are used for cleaning, drying or otherwise treating rejected or damaged grain. There

are two such elevators in Manitoba with a combined capacity of 30,000 bushels per day. Elevators used by millers for storing grain to be used by them are known as mill elevators.

A Stream of Wheat.—Statistics show that in Alberta in 1921 there were 897 country elevators, in Saskatchewan 2,184 and in Manitoba 692, a total of 3,773, with a combined capacity exceeding one hundred and twenty-five million bushels. During the grain season these elevators were shipping out as fast as cars could be secured, and constantly refilling. From hundreds of loading platforms farmers were also shipping direct. As nearly all the western crop passes through Winnipeg the volume of grain traffic can better be imagined than described. Following the great crop of 1915 there arrived in Winnipeg 1,000 cars of wheat every working day for a whole year, besides corresponding quantities of other grains. The Western Grain Inspection Division inspected during that year 338,425,200 bushels of wheat alone. The Canadian Pacific railway alone has hauled as high as 1,000 cars of grain daily into Fort William.

Winnipeg Grain Exchange.—It may readily be imagined, therefore, that Winnipeg would naturally become the dominating grain market of the West, and such is the case. The business has centralized in the Winnipeg Grain Exchange. This institution was incorporated in 1891 and seventeen years later it was reorganized as a voluntary association of grain dealers. At first there were only ten members and the entrance fee was fifteen dollars. Now there are over three hundred members and seats are worth over five thousand dollars each. The Grain Exchange erected a magnificent building at a cost of two million dollars and the staff employed now numbers over fifteen hundred persons. It is in this building that the Government Inspection offices are located. For the crop of 1915 the Winnipeg Exchange distributed nearly five hundred million dollars in cash throughout the Prairie Provinces. The Exchange computes, records and publishes statistics; obtains and distributes information respecting the produce and provision trades; promotes and maintains uniformity in the business, customs, and regulations in these trades among those engaged in them; and adjusts controversies and misunderstandings arising between the traders. It is constantly in telegraphic touch with all the leading markets of the world and every day posts the prices prevailing in London, Liverpool, Paris, Buenos Ayres, Chicago, Minneapolis, Kansas City and Duluth. The prices prevailing on the Winnipeg markets are wired daily to some four thousand points. It is the meeting place of buyers and sellers of grain and the great room in which the transactions culminate is known as "The Wheat Pit." The charge to the farmer for selling grain is fixed by what is known as commission rule and is uniform for every customer. For wheat it is one cent per bushel.

A Sound Institution.—Within the Grain Exchange is an independent corporation known as the Winnipeg Grain Exchange Clearing House. The functions of the Clearing House are to simplify and facilitate trading operations between the members of the Exchange, and at the same time to guarantee absolute security in all transactions concerning the future delivery of grain. Considerable dealing is done in futures. That is wheat may be sold to be delivered during some month considerably in advance of the date of the transaction. Millers, for instance, may buy a year's wheat in advance to be delivered in certain quantities each month. The business of the Winnipeg Grain Exchange and its internal organizations has been conducted on such sound and unquestionable lines that failures are unknown and not a single farmer has ever lost a dollar through it.

Grain Growers' Associations.—One of the most notable results of the remarkable growth of Western Canada's grain business has been the action

of the grain growers themselves in enlarging the sphere of their activities and influence beyond the mere farming phase. Not satisfied in earlier times with the treatment received from elevator operators, railway companies, buyers and shippers generally they organized many years ago for the purpose of compelling government action in legislating control of the business, and the Canada Grain Act is largely the outcome of their agitation. The movement resulted in the following great associations rapidly springing into being, namely: in Manitoba, The Manitoba Grain Growers' Association; in Saskatchewan, The Saskatche-

GRAIN EXCHANGE, WINNIPEG

The financial centre of the grain trade of Western Canada. Here all the large grain and milling companies have their offices.

wan Grain Growers' Association; and in Alberta, The United Farmers of Alberta. In recent years the political field has been invaded, and, as a result, the year 1922 witnessed a Farmer Government in control of the Alberta Legislature and members from the Federal Progressive (Farmers') Party occupying thirty-nine seats at Ottawa out of a total representation of forty-three from the three Prairie Provinces.

Co-operative Grain Companies.—To counteract any combine of business houses that might operate to their disadvantage the farmers organized trading companies along co-operative principles, in which they themselves are the shareholders. The first of these was The Grain Growers' Grain Company. It was organized in 1906 without government aid and was interprovincial in character. In 1913, The Alberta Farmers' Co-operative Elevator Company was organized for the province of Alberta, with provincial aid. In 1917 these

two companies were amalgamated as United Grain Growers, Limited. Another large company is The Saskatchwan Co-operative Elevator Company, organized in 1911 on a provincial basis and with government aid. United Grain Growers, Limited, handles grain and live stock on consignment and also supplies farmers with machinery and general commodities. The Saskatchewan Co-operative Elevator Company handles only grain.

The success that has been attained in the grain business by these companies has been phenomenal. They own or control great numbers of country elevators through the three Prairie Provinces and have erected or leased terminal elevators at Fort William and Port Arthur having storage capacities of nearly six million bushels. They have become the greatest commission agencies in Winnipeg. A subsidiary company of United Grain Growers, The Grain Growers' Export Company, has established an immense export business from New York, and during the war its whole machinery was turned over to the British Government for the benefit of the Allies.

A Weekly Paper.—The organized farmers soon felt the need of a publication under their own control, and in 1908 *The Grain Growers' Guide* was established by them at Winnipeg. It now has a weekly circulation of over eighty-one thousand, the largest circulation of any farm paper in the West. It is the official organ of the farmers' movement of the three western provinces.

The magnitude of the grain business of Western Canada is a matter of national pride and the fact that such a large percentage of it centres in Winnipeg gives to that city and to the province of Manitoba a commercial advantage of unusual proportions. The capital involved in the rolling stock and elevators alone devoted to this business is tremendous. Thousands of box-cars and millions of dollars invested in elevators are involved. The Dominion Government own and operate huge terminal and interior terminal elevators. The Manitoba Government went into the elevator business several years ago and after building or purchasing several leased them to grain buying companies. The railway companies have millions invested in cars and country and terminal elevators. Thousands of persons are engaged in getting the grain bridged from the producer to the consumer.

The Wheat Board.—During the war a Board of Grain Supervisors of Canada was appointed by the Dominion Government under the War Measures Act to control the disposition of the grain crops. Offices were established at Winnipeg and the crops of 1917 and 1918 were marketed under the control of this board. After the war this board was replaced by the Canadian Wheat Board, which was established on July 31, 1919, to dispose of the crop of that year. The board was given power to control the sale of wheat both for home consumption and for export, and, for a time, it also fixed the price of flour in Canada. In the disposal of wheat the board adopted a scheme whereby the producer received an initial payment and a participation certificate which entitled him to a further payment when all returns were pooled. The final result gave to the producer a price of two dollars and sixty-three cents per bushel on the basis of No. 1 Manitoba Northern in store at Fort William or Port Arthur. Crops in 1920 and 1921 were again handled by private enterprise but there is considerable agitation in evidence for the re-establishment of the Canadian Wheat Board.

Financing the Crop.—Finally one very important aspect of the business must not be overlooked, and that is its financing. When the farmer sells grain he sells for cash. As his harvest comes only once a year it is evident that he must have money without delay even though, in some cases, his grain does not reach the miller for many months. The financing of the great grain

crops of the West is done by the banks and their economic value in this instance cannot be over-estimated. Without the means to place the grain business on a cash basis there would be a depressing effect on the greatest industry of the prairies, grain growing, with consequent disastrous effects on every phase of commercial and industrial activity.

Mercantile Business

The mercantile interests are widely represented and highly developed in Manitoba. Especially is this true of the wholesale distributing houses. By reason of its interior location it has always been necessary that Manitoba should carry on hand large stocks and supplies of merchantable goods of every description. In the early days the trading companies could replenish their stocks but once a year. The Hudson's Bay Company's ships, sailing from England, entered Hudson bay, if possible, every summer, but it was advisable to make provision for laying up extra heavy supplies at York Factory and elsewhere to guard against a shortage in case of failure to keep up the annual schedule. In like manner the old Northwest Company aimed to maintain a large reserve stock at their western headquarters at Fort William.

After the amalgamation of these rival companies in 1821 and the founding of the Red River colony, the base of supplies was transferred to Fort Garry, which, long before Manitoba became a province and entered Confederation, had secured a hold on the plains of Western Canada as the metropolis of this new world. The commercial lead thus gained by Fort Garry, the nucleus of the present capital city of Winnipeg, coupled with its strategic geographical location, has been easily held and wonderfully expanded.

Winnipeg, the Metropolis.—To-day Winnipeg dominates the trade of Western Canada. In lesser degree every city and town in the province enjoys the advantage of Manitoba's unique geographical situation. Goods imported for sale in western Canada are received principally from eastern and southern sources. Those coming from the east, whether the products of eastern provinces or of Europe or elsewhere, must suffer the unavoidable risks and delays of the long haul, whether by lake or rail, that the intervening sparsely settled country makes necessary. Goods imported from the south are subject to the delays of transportation and customs clearing.

Wholesale Business.—To facilitate the movement of supplies to various retail establishments, and to avoid shortage of stocks and vexatious delays that would be encountered were the bases of supplies at distant centres, a system of gigantic wholesale houses has sprung up in Winnipeg, Brandon, and to some extent in the other Manitoba centres Anticipating the requirements of smaller dealers, these huge concerns keep on hand supplies of every description in commercial demand throughout the great western and northern regions of Canada.

This great wholesale importing and distributing business enables the bringing of goods to the province in bulk, thus securing the lowest transportation rates. In like manner goods are handled and stored in the most economical way. As a highly developed system has been evolved for gathering together the grain from the many prairie producers and moving the great accumulating bulk to distant markets, so another system, working in a reversed manner, is found in the mercantile field, whereby goods are imported in bulk and distributed through the various channels to the prairie consumer.

Winnipeg's wholesale business has grown with wonderful vigour. It is difficult to arrive at even an approximate estimate of the volume of a single year's business, but the following figures, compiled by the Winnipeg Board

of Trade, a few years ago, show the principal imports during a one-year period. Some 26,600 carloads are reported and this list is by no means complete.

PRINCIPAL IMPORTS INTO WINNIPEG IN ONE YEAR

Agricultural implements	5,000	carloads
Iron products	4,000	"
Wire, nails and fencing	3,000	"
Cement	2,000	"
Hardware	2,000	"
Dry goods	2,000	"
Sugar	2,000	"
Canned goods	1,500	"
Machinery	1,500	"
Sewer and drain piping	1,500	"
Crockery	500	"
Paints	400	"
Tinware	300	"
Shoes	300	"
Glass bottles	300	"
Pianos and organs	300	"

Nearly $6,000,000 worth of agricultural implements and parts passed through the customs port of Winnipeg during the fiscal year of 1919. During that period there were also imported over four and a quarter million dollars worth of hemp, jute and flax products; a million and a half dollars worth of green fruits; a million dollars worth of clothing; a million dollars worth of silks; over half a million dollars worth of drugs; one-third of a million dollars worth of books; one-third of a million dollars worth of hats and caps; one-quarter of a million dollars worth of boots and shoes; more than one-third of a million dollars worth of other leather products. Nearly $200,000 worth of wool yarn was imported in the same period.

Enormous Exports.—Exports from the consular district of Winnipeg to the United States during the year 1919 reached the enormous total of $41,567,156, as compared with $25,165,611 for the previous twelve months. Cattle shipments totalled $14,004,151; furs, $4,246,941; wheat, $4,066,454; hides, $3,077,489; lumber, $2,920,894; fish, $1,831,378; butter $1,567,279; newspaper print, $1,420,089; beef, $1,362,168; rye, $1,046,907; seneca root, $500,632; and flax, $429,002. Other products were pork, middlings, eggs, oats, scrap iron, oleo sterine, screenings, rags, wheat flour, barley and oatmeal. The great bulk of grain shipped easterly is not included in this list.

A Large Retail Centre.—Winnipeg is, of course, easily the third largest retailing centre in Canada, with over 2,000 stores. There are 30 bakeries, 132 butchers, 60 clothiers, 108 coal and wood dealers, 64 confectioners, 78 drug stores, 93 dry goods, 28 furniture dealers, 38 furriers, 55 garages, 528 groceries, 45 hardware dealers, 65 jewellers, 50 implement dealers, 58 lumber dealers, 180 tailors and 45 milliners, in the retail, and 24 confectioners, 24 clothing, 35 builders' supplies, 35 dry goods, 8 drugs, 25 fruit, 28 grocers and 12 hardware dealers, in the wholesale line.

World's Largest Railway Yards.—Geographical situation alone explains Winnipeg's importance as a transportation centre and accounts for its having become the outlet for the grains of the agricultural west. The Canadian Pacific railway has built up here the largest individually-owned railway yards in the world, with 187.71 miles of siding and a storage capacity for 5,543 cars. The same company, has, in addition, the Transcona yards, within four miles of their station, with trackage of 121.43 miles and storage capacity for 10,333 cars. The Canadian National railway has trackage in Winnipeg yards of 149.07 miles and a storage capacity for 6,427 cars. In addition to this there are several hundred miles of public siding scattered through the business section of Winnipeg. In this respect the city is well equipped for the future.

Brandon, A Wholesale Centre.—Brandon is also making rapid progress in the wholesale business. Its situation in the heart of one of the world's finest wheat belts and its excellent transportation facilities give it an unusual advantage in the handling of agricultural supplies. Many such lines are manufactured locally and large quantities are imported from the United States Its retail houses are especially substantial and cover a wide variety of lines.

The total number of commercial houses, large and small, listed in Bradstreet's book of commercial ratings, for the province of Manitoba is 9,733. Of this number 4,119 are in Winnipeg, 328 in Brandon, 197 in St. Boniface and 138 in Portage la Prairie. According to the same source of information establishments having an estimated wealth of one million dollars or over, number 133. Of these 95 are located in Winnipeg, 2 in St. Boniface, 7 in Brandon and 2 in Portage la Prairie. Those rated between one-half million and one million dollars number 86.

Banking and Insurance

Winnipeg is the financial and commercial centre of Manitoba, as indeed it is also of the whole middle west. All the important banks have large offices there, many of which are headquarters for operations throughout Western Canada. The Union Bank of Canada has its head office in Winnipeg. The city is also the headquarters of most of the important loan, mortgage, insurance and financial institutions operating in Western Canada. A number of these have their head offices in the city. The development of mining in northern Manitoba has also necessitated financial operations of considerable magnitude and these are usually initiated and carried through in Winnipeg.

Chartered Banks.—The chartered banks of Canada have in all 320 branches in Manitoba, as compared with 4,650 in the whole of Canada. In Winnipeg 15 banks are represented with a total of 84 branches. Brandon has 8 branches.

Bank clearings are often cited as an index of business activity. However, in comparison between a period of normal price conditions and one in which high prices, such as we have just been experiencing, prevails, allowance must be made for inflation. The following table shows the bank clearings of Manitoba, Winnipeg, Brandon, and Canada as a whole during the period 1900-1922. It will be seen that the clearings in Manitoba constitute about 15½ per cent of the total clearings in the Dominion:—

BANK CLEARINGS, CANADA AND MANITOBA, 1900-1922

Year	Canada	Manitoba	Winnipeg	Brandon
	$	$	$	$
1900	1,584,869,243	106,956,792	106,956,792	.....
1905	3,335,530,600	369,868,179	369,868,179	.....
1910	6,153,701,587	974,694,051	953,415,182	21,278,869
1911	7,391,368,207	1,202,192,416	1,172,762,142	29,430,274
1912	9,143,196,764	1,570,693,399	1,537,817,524	32,875,875
1913	9,275,139,154	1,667,163,572	1,634,977,074	32,186,498
1914	8,087,728,595	1,397,358,249	1,370,960,806	26,397,443
1915	7,805,888,010	1,557,825,247	1,530,683,124	27,132,123
1916	10,509,496,068	2,040,717,775	2,011,795,257	28,922,518
1917	12,564,633,205	2,653,354,314	2,622,924,702	30,429,612
1918	13,776,332,726	2,395,388,507	2,362,734,211	32,654,296
1919	16,701,279,382	2,353,647,032	2,316,724,263	36,922,769
1920	20,283,555,305	3,057,452,638	3,016,054,299	41,398,339
1921	17,446,198,259	2,721,723,826	2,682,441,103	39,282,259
1922	16,247,121,737	2,597,016,042	2,563,938,704	33,077,338

Insurance Companies.—As the leading financial city of the West, Winnipeg is the centre of the activities of insurance companies doing business in that portion of Canada. A number of these have their head offices in that city, and some, through community of interest, are associated with trust and mortgage institutions. At Winnipeg is the head office of the Great West Life, one of the large insurance corporations of Canada, with total assets in excess of $37,000,000, and insurance in force totalling over $286,000,000. There, too, is located the head offices of the Canadian Fire Insurance Company, the gross amount of whose policies in 1920 was over $45,000,000; the Occidental Fire Insurance Company with policies in excess of $40,000,000; and the Grain Insurance and Guarantee Company with policies amounting to over $65,000,000.

Government Regulations.—The Manitoba Insurance Act requires that the companies incorporated to do an insurance business in Manitoba take out provincial licenses. Companies under Dominion license are required to secure certificates of registration from the province. As at November 31, 1920, there were thirty-one licensed insurance companies doing business in the province, and one hundred and ninety-five doing business under certificate of registration.

The following companies operating under a Dominion license have their head offices in Manitoba; Beaver Fire, Canada National Fire, Canadian Fire, Canadian Indemnity, Grain Insurance and Guarantee, Merchants Casualty, North Empire Fire, North-West Fire, Occidental Fire, Great West Life, Monarch Life, Sovereign Life, Western Life.

The following table shows the magnitude of the insurance business in Manitoba in 1920:—

	Risks in force	Premiums	Losses
	$	$	$
Licensed companies	129,214,189	751,157	263,941
Registered companies	551,803,708	13,336,487	4,433,312
Total	681,017,897	14,087,644	4,697,253

Fees and charges exacted by the province are as follows:—

Filing of documents prior to issue of license	$ 5 00
Service of Insurance Inspector acting as attorney for service of process	5 00 annually
Registration—	
Fire, life or hail companies	$200 00
Accident, guaranty or surety	100 00
Inland marine or plate glass	25 00
Underwriters' permit	100 00

Income tax—2 per cent on gross premium income.

Agents' license fees—	
Fire insurance—cities, $20; towns, $5; villages	$3 00
Mutual fire insurance	3 00
Life insurance and miscellaneous	2 00

Unlicensed insurance—If business is written through a special broker, 2 per cent of premiums; otherwise, the assured pays.
Special brokers must be licensed.

Mortgages, Loans, Rural Credits and Public Finances

Mortgage and Loan Companies.—As Winnipeg is the great banking centre of the middle west so also is it the centre of the operations of mortgage and loan companies. The prairies with their thousands of acres of farming land require large sums to finance agricultural operations and therefore the farm mortgage loan business is a very large one. Loaning institutions, many of them supplied with funds from Great Britain, France, the Netherlands and other foreign countries, have offices in Winnipeg. Some of the largest investment companies in the Dominion practically make Winnipeg the central point for their operations, which extend over the entire West.

Mortgage loans to agriculturalists and home-builders are provided by one hundred and forty companies who devote themselves entirely to that form of public service and have at the present time approximately $55,000,000 in loans outstanding in Manitoba.

Other institutions also engage in that business but do not confine themselves wholly to it. For instance, at the present time, forty trust companies have investments of $18,000,000 in the form of mortgages. Life insurance companies' investments of the same kind aggregate $41,000,000 and fire insurance companies $10,000,000, making a total of $124,000,000 of capital furnished by these financial organizations for home building and agricultural purposes.

Demands for agricultural loans at present are met out of the fund which annually accumulates as a result of re-payments and in normal times a large proportion of the interest income is applied in the form of new loans. At the present time, on account of the abnormal state of financial affairs on the continent of Europe, only a very moderate amount of capital from that source is available for mortgage lending purposes. Prior to the war large sums were furnished by Europe. There is, however, a steadily increasing amount of the savings of the Canadian public which are invested through the various lending institutions in the form of loans to farmers and home-builders and these funds are procurable on reasonable terms and for either short or long periods.

As the population of the province increases, there is a corresponding increase in the demand for capital. There yet remains much territory to be developed and there are large districts in the initial stages of settlement where homes are of a temporary character and which are gradually being replaced by permanent homes, the capital for which becomes available as the districts in question are developed and become productive.

Government Financial Assistance.—The Government of Manitoba has embarked upon financial ventures designed to assist agriculture, which in the older provinces of Canada have usually been left to private initiative. Chief among these are the Rural Credits System, the Farm Loans Associations, and the Provincial Savings Bank, intended to supply the two first-mentioned schemes with funds.

Rural Credits.—The Rural Credits Act was passed in 1917, and provides that when at least fifteen farmers in any district decide to organize a rural credit society they must each subscribe for at least one $100 share in the proposed society and petition the Government for a charter. Before the society can commence business it must have at least thirty-five (35) farmer shareholders, each subscribing for not less than one $100 share. Ten per cent must be paid on the subscribed capital and the balance is subject to call. The Provincial Government takes stock in the society to an amount equal to half that subscribed by the shareholders, and the municipality, within the boundaries of which the shareholders of the society live and farm, takes stock for a similar amount. This means that a society consisting of fifty farmers would have a

subscribed capital of $10,000, 50 per cent of which would belong to the farmers, 25 per cent to the Government and 25 per cent to the municipality. The municipality's subscription need not be paid for in actual cash but may be in bonds of the municipality.

How Managed.—The affairs of a society are managed by a board of directors, three appointed by the members; three by the municipality, and three by the Government. The directors representing the Government must include a graduate in agriculture or an officer of the Government who devotes his time to agricultural work or instruction. Prior to the spring of 1920, the funds required to finance the societies' requirements were obtained direct from the chartered banks, but the societies are now financed by the Government, funds being secured from deposits received by the Government Savings Bank and other sources. The borrowers pay 7 per cent on their loans, 1 per cent being retained by the societies to cover operating expenses.

Purposes for which Loans are Made.—The Act provides specifically that short-term loans secured for members for paying the cost of farming operations of all kinds and increasing the production of farm products shall be for any of the following purposes: (1) the purchase of seed, feed or other supplies; (2) the purchase of implements and machinery; (3) the purchase of cows, horses, sheep, pigs and other animals; (4) the payment of the cost of carrying on any farming, ranching, dairying or other like operations; (5) the payment of the cost of preparing land for cultivation; (6) the payment of not more than one-half of the cost of silos.

All notes covering loans mature not later than the 31st day of December of the year in which the loan is made. Where the loan is for machinery or live stock, or for any other purpose from which returns cannot reasonably be realized by due date, the loan may be renewed from year to year on approval of the directors of the society.

The security given by the borrower to the society is the animals, machinery, goods or personal property of any kind purchased with the proceeds of the loan obtained through the society, together with the offspring of such animals and the crops or other products grown upon any lands for the working of which such loan has been secured.

Since 1917 the Manitoba movement has made rapid progress, the number of societies operating being as follows: 1917, 1; 1918, 10; 1919, 38; 1920, 58; 1921, 73.

LOANS OF MANITOBA RURAL CREDIT BOARD, 1918-1922

Purposes	1918	1919	1920	1921	1922
	$	$	$	$	$
Purchase of stock	39,126	172,532	205,542	109,201	39,174
Machinery	17,840	94,155	212,023	80,166	47,663
Crop purposes	55,041	246,739	330,099	246,232	134,213
Breaking	53,465	247,691	399,868	235,132	76,458
Seed grain	18,165	32,009	144,460	143,846	105,859
Improvements	5,935	18,865	85,295	100,222	87,161
Liabilities	20,969	56,742	274,291	461,032	322,565
Sundry	5,040	183,143	370,952	558,979	630,007
Feed	.....	.....	43,470	.....	.....
Bank	.....	.....	.....	.....	.....
Hail Insurance	.....	.....	.....	.....	23,874
Totals	215,581	1,051,876	2,066,000	1,934,810	1,466,974

Rapid Growth.—Activities of the Rural Credit Societies have developed rapidly. In 1917 the scheme began with only one society, but in 1922 there were 74 in operation. During the first full year of operation less than $50,000 was loaned, whereas in 1922 the total loans reached approximately seven times that amount. The story of the timely aid brought to many struggling settlers by these societies is one of great human interest.

This branch of the public service is not self-sustaining as is shown by the following expenditures made out of the general revenue of the province: 1917, $757; 1918, $5,447; 1919, $16,111; 1920, $30,588; 1921, $25,340; or a total for the five years of $78,243. Hon. Edward Brown, the Provincial Treasurer, in his budget speech for 1922, said the Government had no apology to offer for this charge, believing it to be made in the general interest of the province.

Farm Loans Associations.—The Farm Loans Associations scheme was organized in 1917 by special Act of the Legislature to provide for loans to farmers secured by mortgage on their farms. It is becoming one of the most important financial undertakings of the province, having assets in excess of $6,000,000. According to the Provincial Treasurer, it has, from the first, been self-sustaining, with the exception of an initial grant of $10,000 from the Government to cover organization expenses. This has since been repaid. In addition to helping many settlers, the association has been a great restraining influence on interest rates.

Two amendments have been made to the original Act. One in 1919 abolished the requirement of a sinking fund which the Act had stipulated to retire the principal obligations of the association at maturity. This, however, has never been taken advantage of by the association and a sinking fund is still maintained. The policy of the association has been to invest all repayments of loans in Dominion Government bonds, which are the most liquid asset available. Another amendment in 1921 increased the interest rate charged from 6 to 7 per cent. The loans are made for thirty years on the amortization plan, an equal sum becoming due each year sufficient to pay off both principal and interest in thirty years' time.

During the year ended November 30, 1921, the Association received 1,891 applications calling for loans of $5,096,000. Of these, 1,333 were accepted. The average loan granted was $2.250. The total amount paid out on loans during the year was $6,147,650. The balance sheet shows a net profit for the year of $43,186.38, as against $32,558.60 for the previous year. The cost of conducting business was very low, being only $30,478.77 on a turnover of over $5,000,000 or two-fifths of one per cent, as against three-quarters of one per cent for the previous year.

Government Savings Offices.—The Savings offices opened by the Government throughout the province receive deposits from the public and allow interest on them at the rate of 4 per cent per annum. This is one per cent more than the chartered banks pay. The main purpose of the Savings offices is to furnish money for the Rural Credit Societies. The Provincial Treasurer in his last budget speech reported that these offices are now self-supporting, and the money advanced by the Government in the early months of organization is being rapidly repaid. The resources of the Savings offices consist of the following:—

Treasury bills of the Government	$1,500,000
Deposit receipts issued by the Treasury Department, payable on demand	1,200,000
Victory bonds	240,000
Cash in bank	270,000
	$3,210,000

Public Finance.—The gross debt of Manitoba has increased from $28,323,273 in 1915 to $61,929,870 in 1921. Nevertheless the credit of the province has remained high. The financial affairs of the province are capably administered, and the system of book-keeping employed is often held up as a model of clarity and thoroughness. The Provincial Treasurer in referring to the increase in the provincial debt pointed out that Manitoba owned a province-wide telephone system, that her public buildings outclassed anything on the North American continent, and that during the past five years the good roads system had been greatly extended. These items, he said, together represented $47,000,000, or 75 per cent of the gross debt. He further pointed out that Manitoba is engaged in many other undertakings that other provinces have not resorted to by way of aids to agriculture and the working classes. Ten million dollars of the gross debt, he said, is represented by loans to the Farm Loans Association and by loans to municipalities for housing; whilst another $2,000,000 has been expended in the distribution of hydro-electric power throughout the province.

The net debt representing a direct charge on the consolidated revenue fund, is $24,737,000. The revenue-bearing debt, which is self-supporting, and includes advances to drainage and judicial districts, is in round figures, $37,000,000.

The high credit standing of the province, despite these heavy commitments, is ascribed by the Provincial Treasurer to the scrupulous care exercised in meeting all obligations, the establishment of an unwritten law that in Manitoba there shall be no defaults, great care being exercised by the Government respecting municipalities to avoid defaults, and to the fact that there is held in the treasury cash and first-mortgage bonds to the extent of 25 per cent of the gross debt of the province.

CHAPTER X

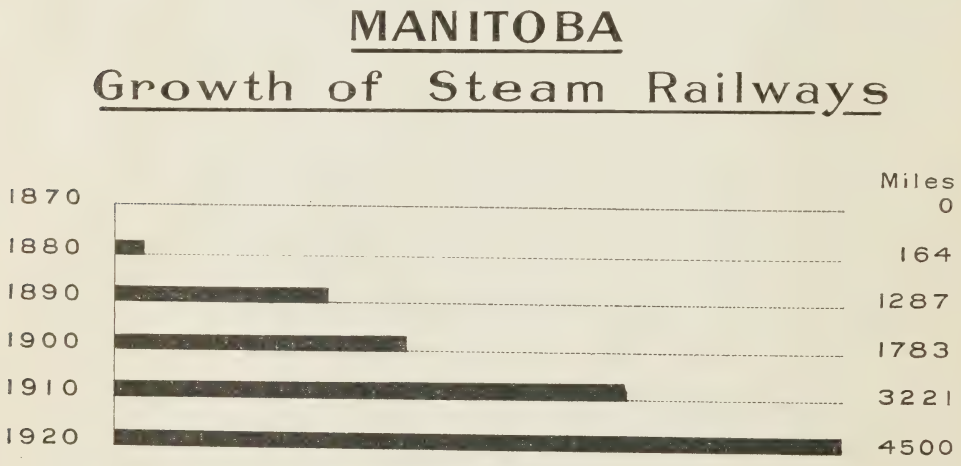
Public Utilities

MANITOBA is well supplied with railways, especially its great agricultural areas in the southern and southwestern parts. Three great Canadian transcontinental railways cross these fertile lands. Branch lines and feeders radiate from every important centre and spread like a network over the plains. From the south, American systems have crossed the border at different points. In northern Manitoba the Hudson Bay railway now extends to within a hundred miles of Port Nelson. The total railway mileage in the province is 4,500, and the city of Winnipeg is the hub of the railway business, not only for the province, but for the whole of Western Canada.

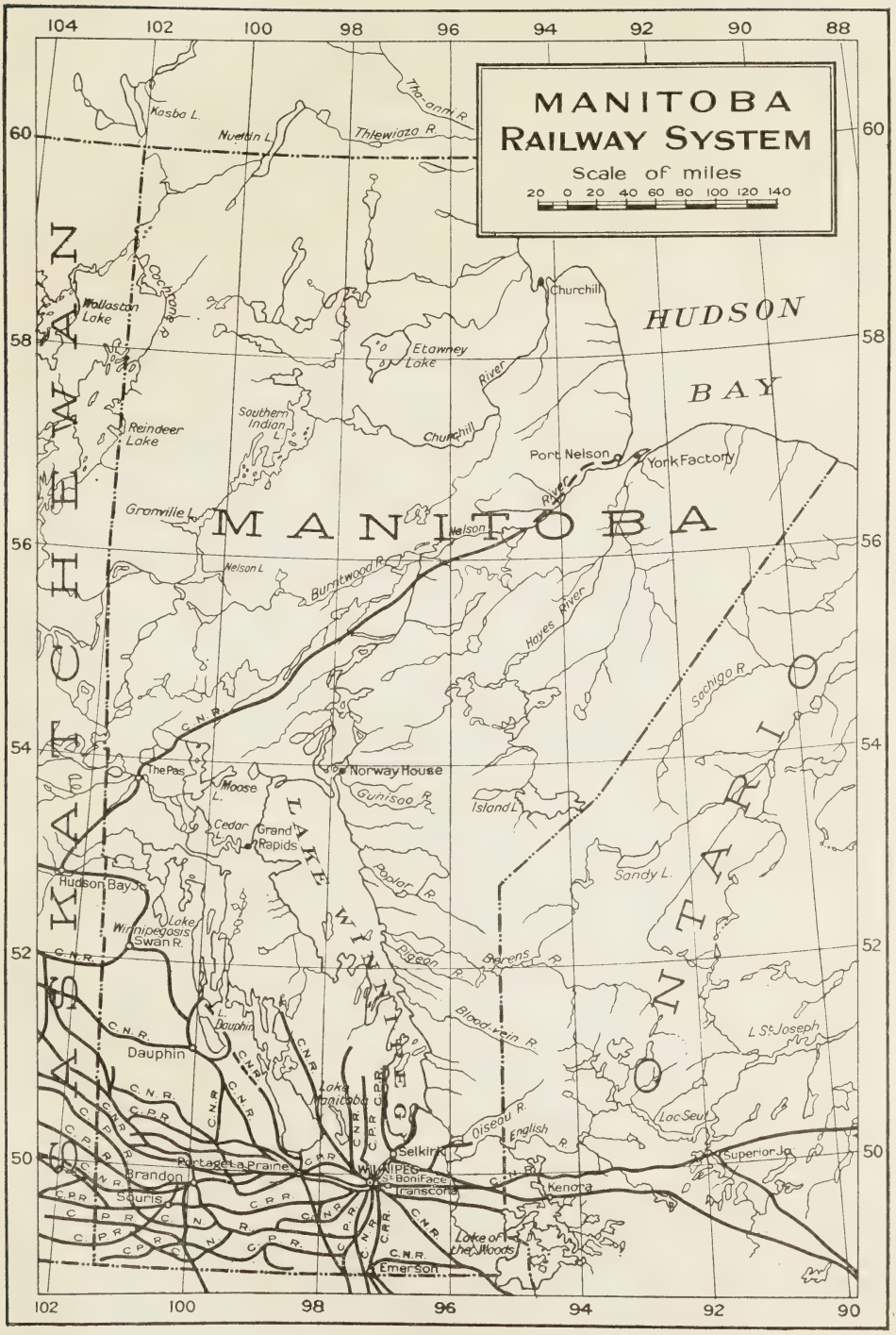
Railways

Three great transcontinental railways cross Manitoba from east to west, namely, the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific. The two latter are now under the control of the Dominion Government and form part of the Canadian National Railway system. In addition to these main lines and their numerous branches are a number of branch lines of the Great Northern railway system of the adjoining republic.

The growth of railway mileage in Manitoba during its first fifty years as a province is illustrated below:—



Beginning of the C.P.R.—Soon after Manitoba became a province in 1870 the construction of a great transcontinental railway was begun to connect the Pacific and Atlantic ports. By the year 1880, 700 miles had been constructed by the Government. It was then decided to turn over the proposition to a company. The terms called for the construction of some 1,900 miles of road in addition to the mileage already built, all of which was to be completed within ten years. In return the company was to receive free the Government sections already constructed, $25,000,000 in cash, 25,000,000 acres of selected land in the "fertile belt," and other concessions. The Canadian Pacific Railway Company from this beginning has developed into one of the greatest transportation systems in the world, controlling telegraph and trans-oceanic steamship lines.


MANITOBA
RAILWAY SYSTEM
Scale of miles
20 0 20 40 60 80 100 120 140
MANITOBA
SASKATCHEWAN
ONTARIO
HUDSON BAY
LAKE WINNIPEG
Kasba L.
Nueltin L.
Thlewiaza R.
Thoa-anni R.
Wollaston Lake
Cochrane R.
Reindeer Lake
Granville L.
Southern Indian L.
Churchill
Etawney Lake
River
Churchill
Port Nelson
York Factory
Nelson River
Nelson L.
Burntwood R.
Hayes River
Sachigo R.
Island L.
Sandy L.
Gunisao R.
Poplar R.
Pigeon R.
Berens R.
Blood-vein R.
L. St. Joseph
Lac Seul
Oiseau R.
English R.
Superior Jc.
Kenora
Lake of the Woods
Emerson
The Pas
Moose L.
Norway House
Cedar Lake
Grand Rapids
Hudson Bay Jc.
Lake Winnipegosis
Swan R.
L. Dauphin
Dauphin
Lake Manitoba
Selkirk
WINNIPEG
St. Boniface
Transcona
Portage-la-Prairie
Brandon
Souris
C.N.R.
C.P.R.
104 102 100 98 96 94 92 90 88
60 58 56 54 52 50

Canadian National System.—The Canadian Northern system, now owned by the Government as part of the Canadian National, has been instrumental in the development of Western Canada, opening up many important agricultural areas. It has a total mileage of 9,566·5 miles and extends from Quebec to Vancouver.

The Grand Trunk Pacific system, extending from Moncton, N.B., to Prince Rupert, B.C., is likewise owned by the Government, and, consolidated with the Canadian Northern, now forms part of the Canadian National Railway system.

Great Northern.—The Great Northern railway of the United States has three branches extending across the international boundary into Manitoba, the Portage la Prairie branch, the Brandon branch, and the Morden branch, with terminals at the respective places mentioned. It also has running rights into Winnipeg from Emerson.

The Midland Railway Company of Manitoba owns freight terminals and yard facilities in the city of Winnipeg. It has trackage rights over the line of the Canadian Northern from Emerson to Winnipeg and has joint use of the Union Station at Winnipeg. It is through this company that the Great Northern and the Northern Pacific arrange for entry to Winnipeg. The Duluth, Winnipeg and Pacific railway has running rights over the Canadian Northern line from Fort Frances to Winnipeg.

Electric lines are operated between Winnipeg and Selkirk, and between Winnipeg and Stonewall.

Street Railways.—Three cities in Manitoba, Winnipeg, St. Boniface and Brandon, have electric street railways. The total length of the Winnipeg system is 110·7 miles of which 89·3 miles are within the city limits.

The railways maintain an efficient telegraph and express service, and in every respect give the same quality of service in Manitoba as elsewhere in Canada. The Government railways operate the Fort Garry and the Prince Edward hotels in Winnipeg and Brandon, respectively, and the Canadian Pacific Railway Company operates the Royal Alexandra in Winnipeg. These hotels, as well as the railway passenger terminals at Winnipeg, rank with the best on the continent.

Waterways

Manitoba's waterways do not occupy a very important place in her transportation systems. They are not, however, without an economic value, particularly in the development of districts yet without railway facilities. The difficult and intricate canoe routes used by early rival fur-trading companies and pioneers, leading from Hudson bay to the north end of lake Winnipeg, in one instance, and from lake Superior to the south end of lake Winnipeg in the other, are now used only by occasional travellers, trappers and Indians.

Red river, in the early days, was the main artery of commerce to Winnipeg, both from the north and from the south. Steamboats commenced to ply on Red river between Fort Garry and points south of the international boundary in 1862. Until the inauguration of a parallel railway service in 1878 this was the principal transportation system of the settlement.

Not Well Suited to Navigation.—The navigation of the inland waterways of the Prairie Provinces is not an economic success. The open season is short, and the rivers of the plains are, as a rule, shallow, muddy, fairly swift in places and liable to sudden rising and falling. The great amount of soil carried in suspension, and the soft nature of much of the river bed results in a constantly shifting channel. In the more rocky sections the rivers are broken by many series of rapids and falls and can be navigated only by the aid of canals and locks.

Red River Navigation.—The principal systems of inland navigation in Manitoba are those on Red river and lake Winnipeg and on the Saskatchewan river and adjacent waters. The headquarters of navigation on lake Winnipeg and Red river is at West Selkirk, some 24 miles north of Winnipeg. Between Winnipeg and Selkirk are found St. Andrew's rapids, to overcome which the Dominion Government constructed the St. Andrew's canal and lock at a point about 12 miles north of Winnipeg. The canal was opened for traffic in 1910 and the total tonnage of freight passing through from that date to the close of 1920 amounted to some 331,000 tons, an average of but little over 30,000 tons a year. This freight consisted mainly of lumber, pulpwood and other forest products which was brought up stream, the traffic down stream being very light. Canadian vessels only use this canal as shipping on the Red river south of Winnipeg has practically disappeared.

Lake Winnipeg.—Lake Winnipeg is over 250 miles in length and nearly 300 miles from the head of navigation at Selkirk to Norway House at the northerly outlet. Fleets of steamboats, tugs, sail boats and other craft employed in the fishing industry ply up and down these waters during the open season. The headquarters for the summer fishing industry are at Selkirk, with other important stations.

In addition to the fisheries, lake Winnipeg has great quantities of timber and pulpwood along its shores. The route to the Rice lake gold fields also leads from Selkirk across the lower end of lake Winnipeg to the mouth of Manigotagan river. This lake has about 1,000 miles of shore line, and, save for a few points at the southern end served by railways, the only means of transportation is that afforded by water traffic.

Saskatchewan River.—The Saskatchewan waterway extends from The Pas, as headquarters, down stream to Cedar lake, and up stream to Cumberland lake. Below The Pas the Saskatchewan river is wide and sluggish and breaks up into numerous intricate channels winding through a low-lying, flat country. Smaller boats are able to connect with Moose lake where there is a small settlement. Cedar lake is an expansion of the Saskatchewan and lies immediately north of lake Winnipegosis. At the entrance to the lake is situated the old Hudson's Bay Company's post, Chemahawin, and a couple of short portages lead from the south shore of the lake to the north shore of lake Winnipegosis. Between Cedar lake and lake Winnipeg the Saskatchewan river once more contracts and flows through a rocky gorge. There is considerable fall between these lakes giving rise to the famous Grand rapids of the Saskatchewan which act as a barrier to navigation and unfortunately prevent the connection of the lake Winnipeg and Saskatchewan river steamboat routes. In earlier days a tram line was operated around these rapids.

Following the discovery of minerals in the district north of The Pas a steamboat service was inaugurated by following the Saskatchewan river from The Pas to Cumberland lake and thence crossing Cumberland and Namew lakes. This section of the Saskatchewan is very crooked but can be successfully navigated during the summer season.

Route to Mining Areas.—After the original discoveries of minerals on Amisk, or Beaver, lake, a wagon route was cut through from Shining bay on the west side of Sturgeon lake to the foot of Amisk lake and for a few years this was the principal route to the gold fields. Later, in order to get a more direct route to the copper deposits on Schist and Flin Flon lakes, the Manitoba Government cut out a new road from the mouth of Sturgeon river on the north shore of Namew lake to Athapapuskow lake. This road is all in Manitoba territory and

the head of navigation at Sturgeon Landing is just within the Manitoba boundary. The Mandy Mining Company have a small steamboat on Athapapuskow and Schist lakes, plying between the end of the wagon road and the mine. Some three or four steamers and tugs and a small fleet of barges are used on this run and the service thus given has proved a great boon in the preliminary prospecting and developing of this northern mining area. Boats engaged in the lumber business also ply from The Pas up Carrot river for some distance, and great quantities of logs are rafted down to be sawn at The Pas.

A number of small boats also ply on lake Manitoba and on lake Winnipegosis. Their principal trade is in connecton with the summer fishing industry. A number of settlers on the shores of these lakes are largely dependent on the summer boat service for transportation of their supplies and products.

A few of the principal waterways utilized by smaller craft might here be briefly mentioned. Prospectors entering the Rice lake field ascend the Manitogotagan and Wanipigow rivers which both flow into lake Winnipeg near its southeasterly extremity. In the mining district north of The Pas a chain of lakes and rivers constitutes a much used route from west to east, connecting at one end with the northern terminus of The Pas steamboat line and at the other end with a new 11-mile wagon road built from a point on the Hudson Bay railroad 82 miles east of The Pas. The best known Manitoba lakes on this route are Athapapuskow, with Schist and Flin Flon lakes to the northwest and Amisk or Beaver lake just west of the Manitoba-Saskatchewan boundary line, Cranberry lakes (three in number), Sandy lake, Elbow lake, Island lake, Reed lake and Wekusko or Herb lake. Still further easterly Grassy river may be followed to join the Nelson at its expansion, Split lake. From Split lake, Burntwood river may be ascended to Nelson House.

An Old Trade Route.—The old trade route between Norway House and York Factory is still used to some extent. Leaving Nelson river a short distance below Norway House a chain of lakes leads to the headwaters of Hayes river. Lakes and connecting streams give access in this region to Oxford House, Gods lake and Island lake, where a certain amount of trapping and prospecting is being carried on. The Hayes river route reaches Hudson bay at York Factory. An alternative route is to follow Nelson river. After leaving Norway House, this route passes a small settlement at Cross lake and by a detour at Landing lake reaches the Hudson Bay railway at Mile 185. By keeping to the Nelson, the railway is crossed at Manitou rapids and again below Split lake at Kettle rapids.

There is little traffic by water above Kettle rapids but from this point to Hudson bay, which is reached at Port Nelson, the water is utilized to a greater extent. The Long Spruce and Limestone rapids, which are found below Kettle rapids, prevent power navigation on the whole of this section but shallow draft boats are able to ascend the Nelson for some 60 miles from its mouth.

Churchill River.—Still further north is the great Churchill river, giving a canoe route across the northern parts of Manitoba and Saskatchewan and connecting by the famous Methy portage with the waterways of the great Mackenzie basin. These waterways are used by few except Indians and trappers. An expansion of the Churchill in Manitoba forms the great Southern Indian lake and at the mouth of the river is found the natural harbour of Churchill. From Churchill river Reindeer lake is reached and on its north shore is found the trading post of Du Brochet. In fact the canoe is the only means of travel throughout Manitoba's great Laurentian regions during the summer time and by it practically every nook and corner may be reached.

Highways

Manitoba's rectangular system of land survey has accounted for a network of highways running north and south and east and west at regular intervals. The principal exception to this general rule is found in the territory adjacent to Red river and the lower part of the Assiniboine. Here the early Selkirk settlers had arrived before the surveyor, and choosing their land fronting on these rivers they travelled back and forth by the most convenient routes thus making trails through their holdings which later became established roads.

BREAKING NEW ROADS

The spread of settlement requires the constant opening up of new highways. Mechanical means are used almost exclusively in this work.

Road Allowances.—In subdividing Crown lands and throwing them open for homestead, the Dominion Government set apart regular road allowances, but left to the Provincial Government the task of making the actual road. In certain instances the theoretic road allowance fell in impossible places making road diversions necessary. In other instances the building of a bridge, the grading of a hill or the draining of a slough was all that was required to make such road allowances passable. Again, hundreds of miles of road allowances, laid off on the prairies with mechanical regularity, have been followed without a single attempt at road making.

Provision is made for road allowances running north and south at one mile intervals and running east and west at one mile intervals in the first system and two mile intervals in the third system of survey. As a township, in either case, is practically six miles square, consisting of 36 sections each one mile square, it will be seen that in the first system of survey it will contain 72 miles of road allowances, counting half the exterior mileage. In like manner a township of the third survey will contain 54 miles. Road allowances under the first system of survey are one and one-half chains in width (99 feet). Under the

third system they are one chain (66 feet) wide. The area of land included in road allowances in the surveyed tract is close to 975,000 acres. The building of permanent trunk systems has become a matter of vital importance. Owing to the absence of stone or gravel from great areas of Manitoba's wheat lands the cost of such permanent construction is greatly increased by the necessity of securing material from distant sources.

The Good Roads Movement.—Both Provincial and Dominion Governments have taken steps to assist rural municipalities in securing the advantages of better roads. In 1914 the Manitoba Good Roads Act was passed, and amended in 1920. It provides for a Good Roads Board, of which the Highway Commissioner is chairman. The board is required to pass upon all applications for improvement of main market roads, which are provided by municipalities. The board can only authorize expenditures, the municipality's share of which does not exceed ten per cent of the taxable real property in the municipality.

Federal Assistance.—The Dominion Government in 1919 passed the Canada Highways Act, being chapter 54 of the Acts of 1919. The sum of $20,000,000 was appropriated to aid the several provinces in good roads, as follows: $80,000 to be paid each year, for five years from 1919, to each province; the remainder to be paid in proportion to the population of each province; each highway constructed to be under the terms of the agreement with each province; a sum equal to 40 per cent of the actual cost of the work so undertaken to be paid by the Dominion. Roads are now being constructed or improved under the terms of both these Acts and the good roads movement is well under way in Manitoba.

The primary purpose of the Manitoba Good Roads Act is to assist municipalities in the development of a system of good market roads. The Highway Commissioner has estimated that about 18,000 miles carry 75 or 80 per cent of rural traffic. He also estimated that about 2,000 miles of provincial highways will be required in the near future to accommodate inter-municipal traffic.

The amount of work performed under the Manitoba Good Roads Act from its inception in 1914 to the end of the season of 1921 is shown in the following statement:—

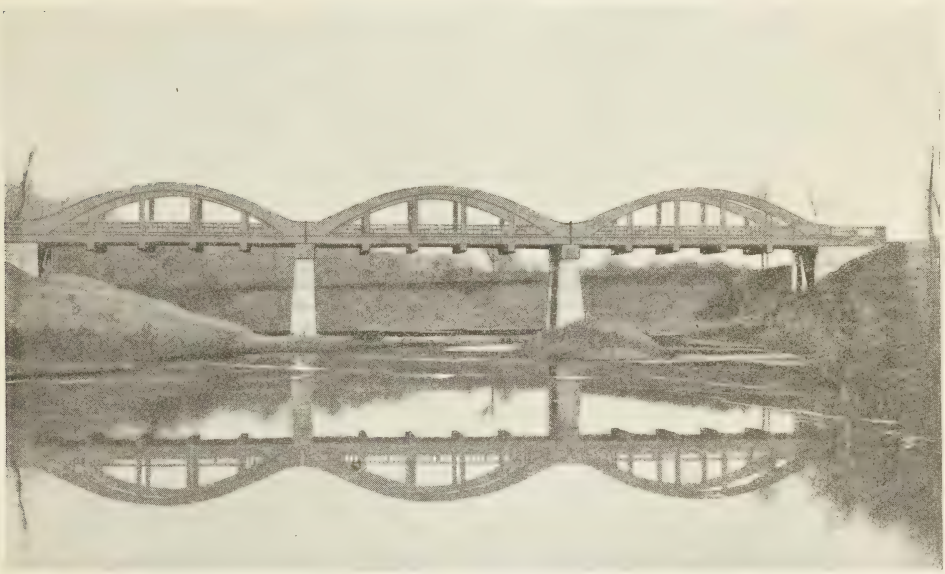
ROADS AND BRIDGES CONSTRUCTED UNDER GOOD ROADS ACT OF 1914

Mileage of roads authorized to November 30, 1921	6,095
Number of bridges authorized to November 30, 1921, exclusive of those on Good Roads systems	396
Amount expended by municipalities on roads to November 30, 1921, on which Government percentage was paid	$3,444,071.10
Amount expended by municipalities on bridges to November 30, 1921, on which Government percentage was paid	654,100.45
Total	$4,098,171.55
Amount paid by Government to municipalities on roads to November 30, 1921	$3,238,517.23
Amount paid by Government to municipalities on bridges to November 30, 1921	589,489.22
Total	$3,828,006.45
Total amount expended on roads and bridges by municipalities and Government combined since the inception of the Act to November 30, 1921	$7,926,178.00

Trunk Highways.—Under the Canada Highways Act a number of main trunk routes have been selected for permanent improvement. Sections already under agreement total nearly 800 miles. East and west these trunk routes will connect with similar roads in Ontario and Saskatchewan. One of them will constitute part of the Canadian National Highway.

To the south, the Winnipeg-Emerson route, commonly known as the Selkirk highway is all under agreement and will provide a suitable connection with the United States Jefferson and other highways. Its length is 56 miles. North from Winnipeg, another route 77 miles in length leading to Icelandic river and other points on lake Winnipeg is under agreement. Another route leads west from Winnipeg through Portage la Prairie, Brandon and Virden. This will form part of the National highway. Three sections under agreement total 136·5 miles. Two other routes run west from Winnipeg to the Saskatchewan boundary, to the north of the Portage la Prairie and Brandon routes. Large sections are under agreement on each. Connecting north and south roads are also proposed.

From Portage la Prairie a main trunk road will lead north and west through Gladstone and Neepawa to Dauphin. Here it will branch west to the



PERMANENT HIGHWAY BRIDGE

Manitoba is building for the future in all public construction. The illustration shows an artistic reinforced concrete bridge at South Cypress.

Saskatchewan boundary, north to Winnipegosis and northwest to Swan River. Sections are under agreement adjacent to Gladstone, Dauphin and Swan River. Other provincial and market roads will give the main farming section of Manitoba a network of good roads that will be of great economic value to the rural dweller and enable the rapidly increasing automobile traffic to operate at all time of the open season.

Mining Roads.—In outlying and unorganized districts the Provincial Government is meeting the requirements of development as rapidly as possible. In the Northern Manitoba mining area roads have been constructed from Sturgeon Landing to Athapapuskow lake and from Mile 82 on the Hudson Bay railway to Wekusko lake. In the Rice Lake mining district a road was recently opened from lake Winnipeg.

Telephone System*

Telephone service in Manitoba dates back to the year 1882, at which time exchanges were established at Winnipeg, Brandon and Portage la Prairie. The system at that time and until the year 1908 was owned and operated by the Bell Telephone Company of Canada. In 1907 the Manitoba Government entered into negotiations with the Bell Telephone Company and in January, 1908, took over the entire Manitoba system. At this time there were 8,792 telephones in use in Winnipeg and 5,219 telephones in use throughout the balance of the province.

A Government System.—Under Government ownership telephone service in Manitoba has progressed, expanded and developed. Its facilities have been extended to the smallest and remotest towns in the province, not with regard to cost or with an idea of profit, but for the purpose of serving the people.

Development of the Manitoba telephone system during the past few years has been on a large scale and at present the service extends to practically all the settled towns in the province. In the rapid development which has taken place, every precaution has been taken to use only the best material and up-to-date construction methods, with the result, that to-day the people of Manitoba have a telephone system second to none. The lines and equipment of the service are built standard in every particular and it is the aim of the management to keep it at as high a state of efficiency as possible.

Manitoba, with a population of 613,008 people, has 68,000 telephones in use and of these 64,262 are direct subscribers to the Government system—the balance being connected with municipal systems or private companies. These private systems, however, have direct connections with the Government long distance lines and therefore enjoy, with the Government subscribers, all the benefits which accompany connection with the provincial system.

Rapid Growth.—The growth of the Manitoba telephone system has been uniform and continuous. In Winnipeg the number of telephones has grown from 8,823 in 1908 to 38,811 in 1921.

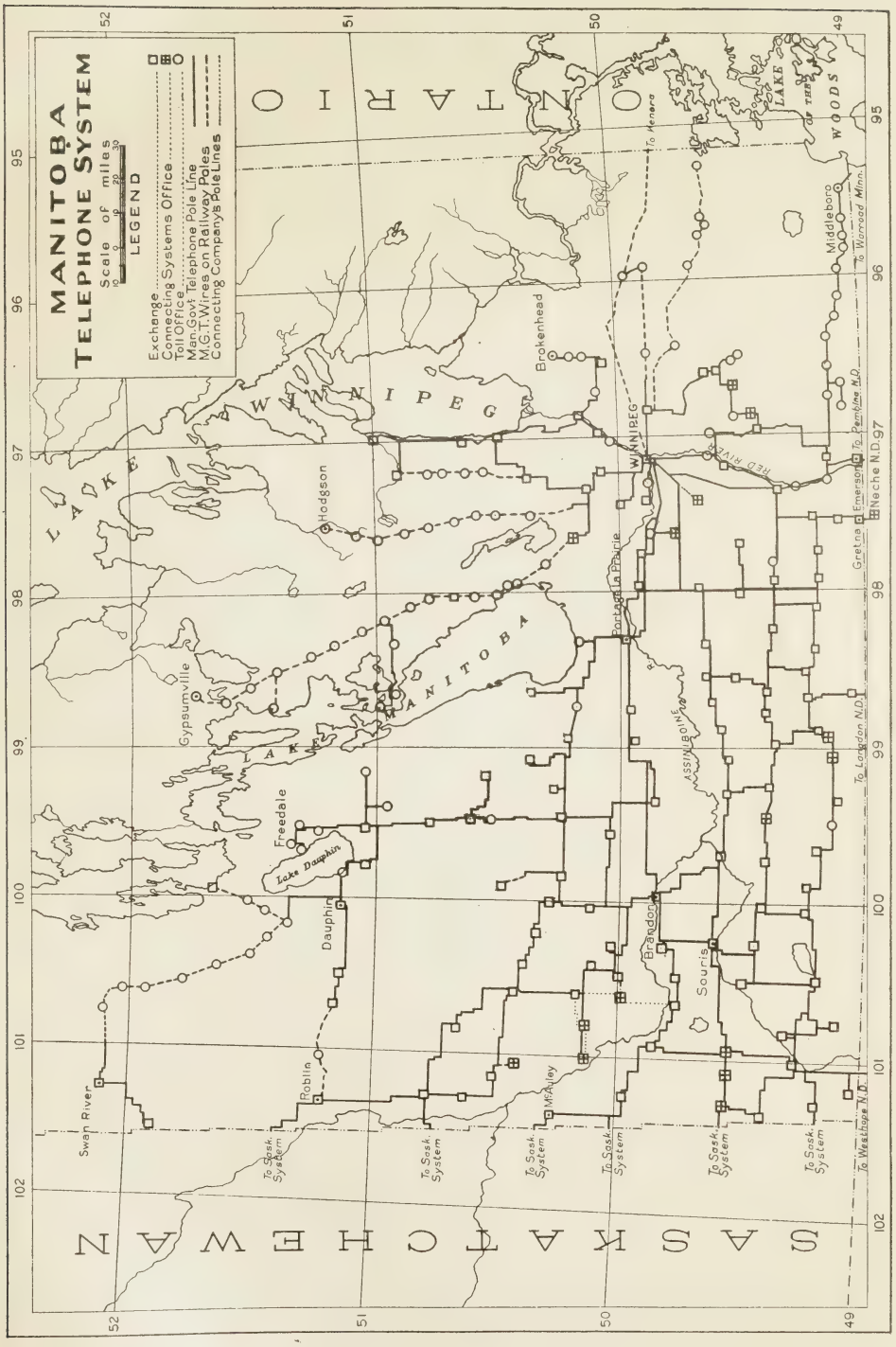
A comparison of the number of exchanges, toll offices and subscribers in the Government system at the beginning of 1908 and at the present time, shows at a glance the changes which have been effected.

INCREASE IN SERVICE, MANITOBA TELEPHONE SYSTEM

——	Exchanges	Toll Offices	Subscribers		Total number subscribers
			Local	Rural	
January, 1908	70	29	12,519	1,523	14,042
March, 1922	116	111	49,306	14,956	64,262
Gain	46	82	36,787	13,433	50,220

Long distance lines of the system have been extended to all the inhabited districts in the province, as well as making direct connection with points in Saskatchewan, North Dakota, Minnesota, Western Ontario, South Dakota, and elsewhere. The long distance lines are constructed of sufficiently large copper wire to permit of commercial long distance service to Montreal and Toronto.

*Data furnished by the Commercial Superintendent, Manitoba Telephone and Telegraph System.


MANITOBA
TELEPHONE SYSTEM
Scale of miles
LEGEND
Exchange
Connecting Systems Office
Toll Office
Man.Govt Telephone Pole Line
M.G.T.Wires on Railway Poles
Connecting Company's Pole Lines
ONTARIO
SASKATCHEWAN
LAKE WINNIPEG
LAKE MANITOBA
LAKE OF THE WOODS
WINNIPEG
Brokenhead
Hodgson
Gypsumville
Fairford
Lake Dauphin
Freedale
Dauphin
Swan River
Roblin
Portage la Prairie
Brandon
Souris
McAuley
Middleboro
Gretna
Emerson
Neche N.D.
To Kenora
To Warroad Minn.
To Pembina N.D.
To Langdon N.D.
To Sask. System
To Westhope N.D.

Mail, Telegraph and Wireless Service

Mail Service.—The mail service of Canada is maintained by the Post Office Department of the Dominion Government at Ottawa. Manitoba, therefore, shares all the advantages of a national postal service with world-wide connection. The expansion of the mail service has kept pace with the rapid growth of the province and has been maintained in a high state of efficiency.

On March 31, 1920, there were in operation in Manitoba 794 post-offices. The gross postal revenue for the year ending on that date was $3,261,473.20. The number of money-order offices in the province in 1920 was 340. Greater Winnipeg and Brandon have street deliveries and collections.

Rural Free Delivery.—A free rural mail system has been inaugurated in Manitoba and there are now 98 rural routes in operation. With the devolpment of the province and the further building of good roads, these rural routes will be extended.

P.O. Savings Banks.—The Post Office Savings Banks are a great boon to residents of Manitoba, especially in outlying sections. Every post office that is authorized to transact a money-order business is also authorized to act for the Central Savings Bank in the Post Office Department at Ottawa. An account may be opened by a deposit of one dollar, and interest is allowed on all amounts up to five thousand dollars. Canadian Government annuities may also be purchased through the postmaster. Full information regarding such matters, as well as purely postal affairs are to be obtained at any post office in the province.

The cities and towns of Manitoba enjoy an efficient postal service but no class of people appreciate the benefits of the system more than those living on farms where rural delivery has been established. The rural mail route and the rural telephone have removed one of the greatest objections of farm life—its isolation. The daily delivery of letters and papers is a most pleasurable event and the many and varied services rendered by the parcel post system are of inestimable value. The extension of the rural service is one of the greatest factors in encouraging land settlement.

Telegraph Service.—The Canadian telegraph systems include lines owned and operated by the Dominion Government and lines owned and operated by railway and telegraph chartered companies.

The companies operating telegraph services in Manitoba and the extent of their undertakings are shown in the following table:—

TELEGRAPH SYSTEMS IN MANITOBA, 1920*

Name of Company	Pole-line Mileage	Wire Mileage	Number of Offices
Canadian Pacific Railway	1,733·00	10,754·00	149
Grand Trunk Pacific	208·20	1,540·20	8
Great North Western	2,488·00	9,321·00	141
Total	4,429·20	21,615·20	298

*Dominion Bureau of Statistics.

Broadcasting Wireless Service.—The introduction of wireless telephones is an innnovation of the present day and the broadcasting of messages is commencing to revolutionize all previous forms of communication. A broadcasting service in Manitoba, which is of inestimable interest and value to rural dwellers in particular is now being provided by both the *Free Press* and the *Tribune* newspaper offices. Stations in Winnipeg with a range that serves the whole of the settled parts of Manitoba recently commenced broadcasting operations. Daily press, market and weather bulletins and programmes are being sent out, which, by the installation of a simple receiving apparatus, reach the individual citizen in all parts of the country. It has been estimated that upwards of 20,000 radio receiving sets are already in use in this province.

CHAPTER XI

Education and Public Welfare

IN its educational facilities and religious liberty Manitoba enjoys an enviable position. From its system of free and compulsory elementary schools to its modern university it offers wide and varied opportunities for the acquisition of knowledge. There are no state churches in the province.

Education

Early Institutions.—Before Manitoba became a province in 1870 education was in charge of the religious bodies. Schools for the English speaking population were established as early as 1820. St. John's College

PUBLIC SCHOOL, VIRDEN, MANITOBA

Substantial buildings mark the progress of education in all portions of the province. Compulsory education is enforced and ample accommodation provided.

after an existence of nearly half a century was incorporated in 1871. The Scottish settlers organized a school in 1849, which also was incorporated in 1871 as Manitoba College. French missionaries were early on the ground. In 1818 Father (later Bishop) Provencher opened a school on land granted by Lord Selkirk, which, in 1823, was established as St. Boniface College. In 1877 this college was affiliated with the University of Manitoba. The Methodist and Baptist Colleges were incorporated in 1877 and 1901, respectively. Under the terms of the British North America Act, each province of the Confederation

constituting the Dominion of Canada is given control of its own educational affairs. Manitoba promptly took up this task and in 1871 passed an Educational Act providing for a system of schools for the province. An educational board was constituted which was to consist of two sections, Protestant and Roman Catholic. Twenty-four school districts were defined and school affairs continued to be administered as before, by the respective church officials.

Free Non-Sectarian Public Schools.—In 1890 Manitoba passed the Public School Act. This Act provided that the public schools should be free and non-sectarian and vested in an Advisory Board all matters relating to the programme of studies to be followed.

Many difficulties were encountered in establishing the public schools throughout the province. Foreign-born settlers, not speaking the English language, had to become acquainted with the system; the lack of teachers had to be overcome by establishing special training schools. Further remedial legislation was passed in 1913 and 1919 and to-day the law ensures the compulsory attendance of children of school age, the use of the English language exclusively and of standard text books in English.

Secondary Schools.—The growth of secondary schools in Manitoba is noteworthy. In 1885 there were two high schools with four teachers, to-day every city, town and village provides a fair measure of high school education. Normal schools exist at Winnipeg and Brandon for the training of teachers and also industrial training schools, and special departments for deaf, blind, and defective children.

Some interesting school statistics are shown in the following table:—

MANITOBA EDUCATIONAL STATISTICS, 1921*

Number of pupils enrolled	129,015
Number in elementary grades	120,400
Number in secondary grades	8,615
Average daily attendance	86,137
Attendance percentage of enrolment	66·76
Number of school districts	2,077
Number of school districts in operation	1,816
Number of school buildings	1,893
Number of school departments	3,596
Number of intermediate schools	86
Number of High schools	31
Number of Collegiate departments	5
Number of Collegiate institutes	11
Junior High schools	2
Teachers' salaries	$4,549,504 86
Debentures approved	2,713,164 00
Expenditures for all purposes for one year	13,079,205 42

*Department of Education, Winnipeg.

University of Manitoba

The University of Manitoba was established by Act of the Manitoba Legislature in 1877 "for the purpose of raising the standard of higher education in the province and of enabling all denominations and classes to obtain academic degrees." The three colleges already existing were affiliated with the university in 1877, namely, St. John's, St. Boniface, and Manitoba. Since 1877 four colleges have been received into affiliation.

An endowment of 150,000 acres was made in 1885, and the corner-stone of the present building was laid in 1900. The courses of study offered are exhaustive and embrace nearly all fields of knowledge in science, arts, philosophy, medicine, agriculture, law, commerce, architecture, languages, political economy, mental hygiene, social work, and child welfare. The enrolment for 1920-21 in degree courses and special courses was 2,151.

Religion

Religious denominations are widely represented and freedom of worship has permitted all creeds to thrive. According to the census of 1916 (the latest figures obtainable) the various principal Protestant religions predominate, with a Roman Catholic census almost equal to the highest single Protestant denomination. The Presbyterians head the list with a majority of about fifteen thousand over the Anglicans, who are second. The Roman Catholics take third place with the Methodists fourth, the Greek church fifth and the Lutherans sixth. These constitute nearly five-sixths of the entire population. Of the remainder the Mennonites, Jews and Baptists come in the order named.

The executive divisions of the Presbyterian and Methodist churches make of the province in each case an individual field, namely, the Synod of Manitoba and the Conference of Manitoba, respectively. The Anglican churches of the province are included in the Ecclesiastical province of Ruperts Land, the Roman Catholic churches in the archdiocese of Winnipeg and the ecclesiastical province of St. Boniface.

In the principal cities and towns of the province some very fine edifices are to be seen while throughout the rural districts the number and excellence of the church buildings is a pleasant surprise to the traveller. In the following table will be found a summary of the religious statistics of the province according to the census of 1916.

RELIGIONS OF PEOPLE IN MANITOBA,* 1916

Religion	Number
Presbyterians	122,174
Anglicans	107,150
Roman Catholics	97,005
Methodists	71,371
Greek Church	48,480
Lutherans	36,839
Mennonites	16,541
Jews	16,443
Baptists	13,750
Protestants	6,713
Miscellaneous**	4,728
Congregationalists	2,891
Other Sects	1,847
Unspecified	1,742
Salvation Army	1,473
Christians	1,428
No religion	1,167
Unitarians	1,094
Pagans	1,024
Total	553,860

*Census of Prairie Provinces, 1916.
**Miscellaneous includes all religions less than 1,000.

Physical and Social Welfare

In no part of Canada is the welfare of the people receiving greater attention from the authorities than in Manitoba.

Public Health.—A Provincial Board of Health carries on an active campaign for the betterment of health conditions, particularly along educational and preventive lines. Among the varied activities of this Board may be men-

tioned, food-inspection, bacteriological work and public health nursing. There are now about fifty public health nurses whose services are increasingly appreciated. The public health nurse goes into the school by legal right, and into the home by virtue of personal qualities which endear her to the inmates. All educational health activities are centred in the organization of public health nursing. When a nurse has been assigned to a district, she receives the co-operation of the Department of Education.

Another most laudable undertaking designed to better the condition of those living in outlying sections is that of public service nursing. Under this scheme, which is the first of its kind to be operated in North America, fully trained nurses, known as public service nurses, are despatched to remote places to give bedside care and first aid to the sick and injured. The results obtained from public service nursing have been most gratifying.

Child Welfare Work.—The Mothers' Allowance Act of 1916 provides support for dependent or neglected children in cases where the mothers are widows or are in need of assistance. Child welfare work receives constant attention in Manitoba. There are now seventeen regular child welfare stations in the province, and conferences are regularly held.

Among other advanced humanitarian measures adopted in Manitoba should be mentioned the improved methods in the treatment of the mentally diseased. Statistics for the first two years show almost 50 per cent of admissions either completely cured or sufficiently recovered to be discharged.

The University of Manitoba provides courses of training in social service.

Sports and Recreation

Realizing the important bearing which wholesome outdoor recreation has upon a people's health, the authorities have provided liberally for parks and playgrounds. In Winnipeg there are 31 public parks covering a total area of 674 acres. Skating rinks are operated during the season. Swimming and folk-dancing are taught in addition to the regular physical culture subjects. Open air sports of all kinds are popular.

Opportunities for the Newcomer

Special attention is being paid by both Dominion and Provincial Governments to the settling of the land and the improvement of farming conditions. The type of settler most urgently required is the man who has had some experience in one or more of the many branches of farming and who is willing to go on the land. For this class of new-comer, the opportunities for success and advancement are unexcelled.

For purposes of considering the outlook in greater detail, agricultural settlers may be classified under the following four heads: (1) farm labourers, (2) homesteaders, (3) purchasing farmers, (4) those specializing in some particular line of agriculture or horticulture. This division will depend largely on their financial standing.

Demand for Farm Labourers.—Farm labourers are in constant demand, especially during the extra busy seasons of seeding, harvesting and threshing. The increased attention being paid to mixed and dairy farming is having a tendency to spread the work of the farm more evenly over the year. The great strides being made in general improvements in rural districts, such as drainage undertakings and road building, provide work during the leisure seasons. Taking the year around there is much work to be done and farm labourers, especially married men, are being engaged in increasing numbers by yearly contracts.

Free Homesteads.—For those desirous of settling on free Government homesteads it may be said that there are still to be had in Manitoba large areas of such lands. While it is true that the prairie sections have long since been alienated from the Crown, it is worthy of note that the homesteader of to-day has the opportunity of acquiring land having a greater immediate value than had the pioneer who secured the apparently more preferable homesteads years ago. When the plains of Manitoba were first settled, wild land had a value of only two or three dollars per acre. Even improved lands were worth only about five dollars per acre. Homesteads may be secured in Manitoba to-day that are worth, in their wild state, anywhere from five to twenty dollars per acre.

INTERIOR OF PROVINCIAL PARLIAMENT BUILDINGS

Grand Staircase Hall at the entrance. The hall is 67 feet square and 71 feet high. The staircase is 20 feet in width, with large bronze buffaloes on either side.

Though such lands require more labour to bring under cultivation than did the open prairies, they cannot be considered unreasonably difficult. The light woods common to much of the homestead land of to-day does not offer serious resistance in clearing. Indeed the returns in firewood and fencing and building material often amply repay the cost of clearing. Upon improvement,

such lands will have a producing value equal at least to and in many cases greater than the improved prairie lands. This may be conservatively estimated at from twenty to fifty dollars per acre.

For the Settler With Money.—To the settler who has sufficient capital to purchase unimproved land situated closer to existing settlements than are the free homestead lands, Manitoba offers exceptional inducements. The Provincial government itself has large holdings of choice unimproved land which it is offering at low rates and on easy terms. Much idle land, held for speculation, is now being forced on the market by wild lands taxes. The Canadian Pacific Railway Company and the Hudson's Bay Company are selling their holdings. The improvements on such lands at once places them on an equal footing with the older farms. Improved farms, of course, are to be secured directly from their owners or through numerous private agencies.

Lands for Sale.—Lists of unoccupied lands for sale giving information regarding the prices at which the owners are willing to sell or lease, terms of payment, distance from railway, nature of soil and acreage suitable for cultivation, may be obtained on application to the Natural Resources Intelligence Service, Department of the Interior, Ottawa.

Small Holdings.—The rapid development of mixed and dairy farming, poultry raising, beekeeping, truck gardening and other intensified forms of agriculture is having a tendency to break up many of the larger farms into smaller holdings. With the improved markets for all diversified products of the land, due to the rapid growth of cities and towns, improved shipping facilities and extension of the export trade, there are now in Manitoba excellent opportunities for the prosecution of such special undertakings.

Land Values.—It is difficult to give other than an approximate value of farm lands in Manitoba. As may be readily understood the value of land varies according to several factors, such as quality, improvements and location. The Dominion Bureau of Statistics, through its crop correspondents, makes each year an estimate of the average value per acre of occupied farm lands in each province in Canada. The average for occupied lands in Manitoba was $27 per acre in the year 1908. Its advance may be noted from the following figures: In 1909 the value was given as $29 per acre; in 1914, $32; in 1918, $32, having made no gain during the war period: in 1919, $35 and in 1920, $39 per acre. The average for the whole of Canada for the year 1920 was $48 per acre.

Examples of individual success on the land are entirely too numerous to mention. Thousands of Manitoba's most prominent farmers started in a humble way on a homestead. It is sufficient to point to the record of the province as a whole, the phenomenal growth of which has been directly due to the success of its agriculturalists. The settler of to-day has many advantages that pioneers of fifty years ago were denied. Perhaps the most inspiring outlook is the certain knowledge that all doubts as to the ultimate success of the cultivation of the land are forever dispelled.

The Artisan and Clerk.—While, of course, persons may find in Manitoba many other opportunities to forge ahead, the risks are greater, except for those who come with sufficient capital to embark on enterprises likely to prove profitable. There is a tendency towards overcrowding urban centres and consequently unemployment becomes unavoidable. Artisans and clerks should not contemplate entering Manitoba with a view of following their usual occupations unless they have previously entered into terms of agreement with their future employers. The authorities do not hold out inducements or assurance of success to

would-be city workers as the ranks of such are already out of proportion to the numbers of rural settlers. When in need of such help, employers invariably advertise for it through the press.

Many of the smaller towns and country villages offer excellent openings for doctors, dentists, nurses, school teachers, and other professionally trained people. Likewise blacksmiths, shoemakers, tinsmiths, carpenters and other artisans can find in such localities fields for the establishment of small shops where they can carry on and build up flourishing businesses of their own. Prospectors and miners will find in Manitoba's mineral areas fields worthy of their attention. It is advisable for all such classes of persons to get in touch with provincial, or preferably local authorities, and secure the fullest information possible before taking steps to locate.

The larger towns and cities all have varying opportunities in many lines of business and information regarding such is always to be had upon request to local authorities. A little booklet entitled *Opportunities in Manitoba,* published in 1921 by Heaton's Agency, Toronto, for the Provincial Government contains valuable information of this nature. Free copies may be obtained from the Department of Agriculture, Winnipeg, or from the Canadian Government offices in London.

Chances for Capital.—Manitoba also wants capital and has inducements of striking character to offer the manufacturer, miner, miller and others. The cities of Winnipeg, St. Boniface, Brandon and Portage la Prairie are all in a position to offer to capital exceptional prospects of handsome returns on investments. The new mining fields of northern Manitoba promise to develop some of the largest camps in America. The pulp resources of the forests await the establishment of mills. The resources and raw materials generally are rich and abundant. Their exploitation demands much capital and promises liberal returns.

CHAPTER XII

Regulations Respecting Development

THE Dominion and Provincial Governments, municipal organizations, transportation companies and other bodies interested in the development of Manitoba publish for free distribution many reports, maps, handbooks and leaflets containing useful and timely information respecting this province. They are also prepared to furnish individual replies to all enquiries from persons contemplating taking up their residence in Manitoba or who are otherwise interested in it. It is, therefore, to the advantage of all intending settlers to apply to these sources for information and to acquaint themselves with the facts and opportunities offered.

Sources of Information

The offices of the High Commissioner for Canada in Great Britain are located in London, also the various offices of the Canadian Immigration and Colonization Department. Trade Commissioners are also stationed in the principal cities and from their offices may be obtained information relating particularly to trade and commerce. In the United States of America, Canadian Government agents are located in several of the principal cities.

Information regarding transportation and entry to Canada may also be secured from the principal steamship companies, including the Canadian Government Merchant Marine, Montreal, and the Canadian Pacific Steamships, Limited, Montreal; from the Canadian National Railways, Toronto, the Canadian Pacific Railway Company, Montreal, and the Department of Immigration and Colonization, Ottawa. For Canadian tariffs inquiries should be addressed to the Commissioner of Customs, Ottawa, and for foreign tariffs applicable to Canada, to the Foreign Tariffs Division, Department of Trade and Commerce, Ottawa.

The Board of Trade, Winnipeg, and the Dominion Bureau of Statistics, Ottawa, should be consulted for information respecting industry and manufactures, and the Department of Labour, Ottawa, for data on labour. Information respecting taxation may be obtained from the Commissioner of Taxation, Ottawa, the Provincial Treasurer, Winnipeg, or the clerk of any particular municipality, with reference to Dominion, provincial and municipal taxation, respectively.

The various federal departments at Ottawa may be addressed for specific information; for instance, the Department of Mines respecting minerals, or the Department of Agriculture respecting farming. For information of a general character, maps, lists of privately-owned lands for sale and particulars of the regulations governing the disposal of Dominion lands, timber berths, grazing leases, mineral rights, water-powers and irrigation schemes, applicants should address the Natural Resources Intelligence Service, Department of the Interior, Ottawa. This office will, when necessary, refer without delay queries requiring the special attention of any other office, to the proper authorities.

General inquiries may also be sent to the Provincial Government and should be addressed to the Commissioner of Publicity, Parliament Buildings, Winnipeg. For detailed information of agricultural conditions in various sections of the province or for advice on agricultural matters, queries may be addressed to the Agricultural College, Winnipeg. For information respecting Northern Manitoba requests may be sent direct to the Commissioner of Northern Manitoba, The Pas.

For information of a more local character the clerk of any municipality may be addressed, or, if the information sought is of a commercial or industrial nature, the local board of trade.

Practically every city and town in Manitoba has a board of trade. That of Winnipeg is highly organized. It occupies a series of permanent exhibition buildings, with offices, lecture halls and a staff of highly trained experts. Enquiries respecting the particular inducements of any city or town may be addressed to the board of trade of such city or town.

It is the desire of all officials interested in the development of Manitoba to furnish the fullest and most reliable information possible to all who contemplate settling in the province. While more people and more capital are desired it is considered essential that settlers and investors should be fully aware of every phase of the situation in order that there may be no regrets or disappointments. The prosperity and happiness of her people is the highest aim of Manitoba.

On the following pages synopses of a few regulations and conditions affecting the entry of new settlers, and the terms under which the resources of the province may be shared, are given. More detailed information will be promptly forwarded in response to requests directed to any of the sources indicated.

Additional copies of this handbook may be secured by applying to the Superintendent, Natural Resources Intelligence Service, Department of the Interior, Ottawa.

Synopsis of Homestead Regulations

What Land is Available.—All surveyed agricultural Dominion lands in Manitoba which are not disposed of and not reserved or occupied, are open to homestead entry. Islands are reserved from entry. An entry does not include the mineral or water rights.

Who May Make Homestead Entry.—The sole head of a family, or any male over eighteen years of age, may homestead one quarter-section of available Dominion land in Manitoba. Applicant must appear in person at the Dominion Lands agency or subagency for the district. Entry by proxy may be made at any Dominion Lands agency (but not subagency), on certain conditions.

Nationality.—No application for an entry for a homestead shall be granted unless the person making the application was at the commencement of the war, and has since continued to be a British subject or a subject of a country which is an ally of His Majesty, or a subject of a neutral country, and unless he establishes the same to the satisfaction of the Minister of the Interior. This does not apply to members of the Canadian Expeditionary Forces naturalized since the war began.

An agent may reserve one available quarter-section as a homestead for a minor over seventeen years of age until he is eighteen, on certain conditions.

Where Entry is Made.—Application for homestead entry may be made by a person eligible under the provisions of The Dominion Lands Act, either at the Land agency for the district in which the land is situated, or at the office of a sub-agent authorized to transact business in the district.

Settlement Duties.—Six months' residence upon the land and cultivation thereof to the extent of 30 acres broken and 20 acres cropped in each of three years. A homesteader may live within nine miles of his homestead on a farm of at least 80 acres, on certain conditions. A habitable house is required except where residence is performed in the vicinity.

The area of cultivation is subject to reduction in case of rough, scrubby or stony land. Live stock may be substituted for cultivation under certain conditions.

When to Begin Residence.—A homesteader is allowed six months from the date of his entry within which to perfect the same by taking possession of the land and beginning his residence duties. Any entry not so perfected within that period is liable to cancellation.

Fees.—The payment of an entry fee of ten dollars is required with the application.

Further information may be obtained from Dominion Lands Branch, Department of the Interior Ottawa.

Synopsis of Mining Regulations

Full information regarding mining regulations may be obtained from the Mining Lands and Yukon Branch, Department of the Interior, Ottawa.

Leases upon specified conditions and terms may be had for coal-mining rights, petroleum and natural gas rights, and for building stone, clay and other construction products.

Claims may be staked where minerals have been discovered and leases obtained for the same after completion of certain requirements.

Synopsis of Timber Regulations

Timber may be cut upon vacant Dominion lands in the province of Manitoba either under license or under permit.

Berths under license of 25 square miles are disposed of at public auction. Annual ground rent of ten dollars per square mile is required and timber of less than 10 inches at the stump may not be cut.

Permits may be issued to owners of portable saw mills to cut lumber, shingles and lath on berths not exceeding one square mile in districts where the settlers cannot secure lumber.

Under certain conditions permits may be granted to cut timber as cordwood, pulpwood, fence posts, etc., and permits are granted to actual settlers having no timber of their own to cut certain quantities for their own use.

Further information may be obtained from the Timber and Grazing Branch, Department of the Interior, Ottawa.

Synopsis of Grazing Regulations

Grazing leases of vacant Dominion lands unfit for agricultural purposes may be issued to British subjects for a period of ten years. Lands so leased are not open to settlement. Lots of not more than 12,000 acres may be leased, and fencing is required.

Community grazing tracts comprising three sections or more may be leased by the Provincial Government. Yearly grazing permits are issued on school lands.

The Timber and Grazing Branch, and School Lands Division, Department of the Interior, Ottawa, will supply information in detail.

Synopsis of Fishing Licenses*

Domestic Permit.—Any resident settler, including Indian, shall be eligible for an annual fishing permit to fish with not more than one hundred yards of gill-net or with a dip-net or with not more than fifty baited hooks, for domestic use, but not for sale or barter. Such permit shall be issued free.

Commercial License.—A commercial license for dip-net fishing shall authorize the use of one-dip for the capture of suckers and other coarse fish not protected by a close season. The fee on such license shall be two dollars.

Commercial fishing is allowed in the larger lakes of Manitoba, and in most cases a limit is set on the amount of fish that may be taken during the summer or winter season, on the amount of fishing contrivance to be used, and on the time the various kinds of fish may be taken. The fees range from two to fifty dollars.

Sturgeon License.—A sturgeon fishing license for commercial fishing shall authorize the use of not more than five hundred yards of gill-net or five hundred baited hooks. The fee on such license shall be five dollars.

A sturgeon fishing permit for domestic fishing shall authorize the use of not more than one hundred yards of gill-net or fifty baited hooks, and under this permit not more than three sturgeon may be taken in one week.

A license to authorize the use of not more than two hundred baited hooks for the capture of catfish may be issued for any of the waters of the province. The fee on such license shall be two dollars.

Synopsis of Game Laws

(The Game Protection Act and The Insectivorous Birds Act)

Protected at All Times:

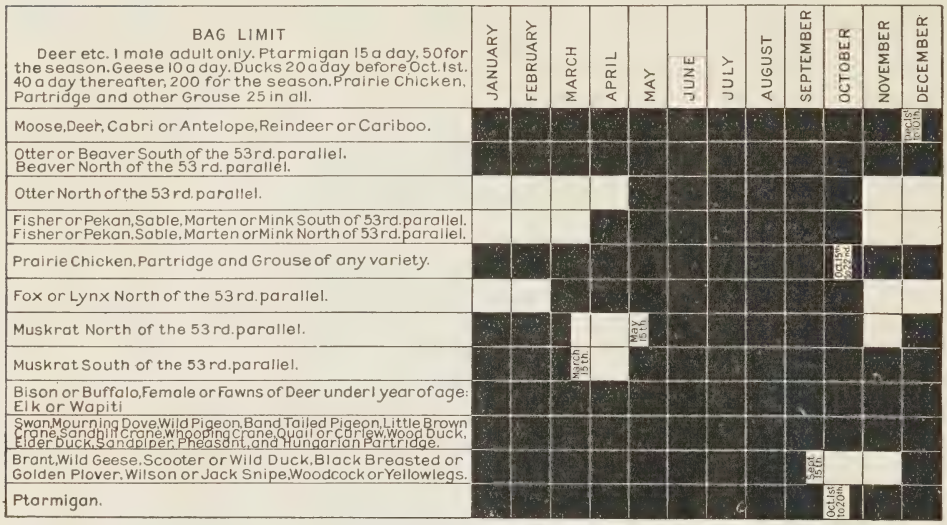
1. Elk or wapiti, and imported game birds.
2. Female deer and the fawns of any deer under one year of age.
3. Insectivorous and migratory non-game birds and their nests and eggs as set forth in the Insectivorous Birds Act.
4. All animals and birds within the Provincial Game Preserves, comprising thirteen in number and described in the Game Protection Act.

*Fisheries Branch, Department of Marine, Ottawa.

UNLAWFUL:

1. Shooting or hunting on Sunday.
2. Shooting or hunting after sunset or before sunrise (except shooting wild geese or ducks from stubble fields).
3. Use of poison, nets, automatic guns, night lights, etc.
4. Allowing dogs at large in haunts of deer.
5. Shooting or hunting on any person's land without permission from the owner.
6. Shooting or hunting without a license (except resident farmers in the case of game birds only).

CHART OF OPEN AND CLOSED SEASONS


BAG LIMIT
Deer etc. 1 male adult only. Ptarmigan 15 a day, 50 for the season. Geese 10 a day. Ducks 20 a day before Oct. 1st. 40 a day thereafter, 200 for the season. Prairie Chicken, Partridge and other Grouse 25 in all.
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
Moose, Deer, Cabri or Antelope, Reindeer or Cariboo.
Ducks to 10th
Otter or Beaver South of the 53rd. parallel.
Beaver North of the 53 rd. parallel.
Otter North of the 53 rd. parallel.
Fisher or Pekan, Sable, Marten or Mink South of 53rd. parallel.
Fisher or Pekan, Sable, Marten or Mink North of 53rd. parallel.
Prairie Chicken, Partridge and Grouse of any variety.
Oct. 1st to 22nd
Fox or Lynx North of the 53 rd. parallel.
Muskrat North of the 53 rd. parallel.
May 15th
Muskrat South of the 53 rd. parallel.
March 15th
Bison or Buffalo, Female or Fawns of Deer under 1 year of age: Elk or Wapiti
Swan, Mourning Dove, Wild Pigeon, Band Tailed Pigeon, Little Brown Crane, Sandhill Crane, Whooping Crane, Quail or Curlew, Wood Duck, Elder Duck, Sandpiper, Pheasant, and Hungarian Partridge.
Brant, Wild Geese, Scooter or Wild Duck, Black Breasted or Golden Plover, Wilson or Jack Snipe, Woodcock or Yellowlegs.
April 15th
Ptarmigan.
Oct. 1st to 20th

Application for further information should be made to The Game Branch, Department of Agriculture and Immigration, Winnipeg, Manitoba.

FOREST FIRES—THEIR PREVENTION AND SUPPRESSION*

(Extracts from The Fires Prevention Act, Manitoba)

7. Any person who shall kindle and leave a fire burning, without taking effectual means to prevent its spreading in or on any woods, prairies, meadows, marshes or other open grounds, not his own property, or who, intentionally or by gross carelessness, permits any such fire to pass from his own land to the injury of the property of any other person, shall, on conviction thereof, be fined in a sum not exceeding one hundred dollars, nor less than twenty dollars, and, in default of payment thereof, shall be imprisoned for a term not exceeding six months.

9. Any person shall be permitted to make or start a fire in any wood, prairie, meadow, marsh or other open ground, for cooking, warmth or other industrial purposes; but such person, before so doing shall—

(*a*) Select a locality in the neighbourhood in which there is the smallest quantity of combustible material or the least likelihood of fire spreading;
(*b*) Clear the space in which he is to light the fire by removing all vegetable matter, dead trees, branches, brushwood and dried leaves from the soil within a radius of ten feet from the fire.

(2) He shall also exercise and observe every reasonable care and precaution to prevent such fire from spreading, and carefully extinguish the same before quitting the place.

NOTE.—No other fires than mentioned in clause 9 shall be started in any wooded district from the first day of April to the fifteenth day of November in any year except on written permission from a fire guardian.

* Forestry Branch, Department of the Interior, Ottawa.

13. Any person who throws away or drops any burning match, ashes of a pipe, lighted cigar or cigarettes, or any other burning substance, or who discharges any firearms, shall completely extinguish, before leaving the spot, the fire of such match, ashes of a pipe, cigar, cigarette, wadding of the firearm or other burning substance.

14. Every person guilty of a violation of the last preceding section shall be liable, upon summary conviction before any justice of the peace, to a fine not exceeding one hundred dollars, and, in default of payment, for a term of imprisonment not to exceed six months, and in addition he shall be liable for all damage caused by any fire resulting from a violation of the said section at the suit of any person suffering such damage.

Customs and Freight Regulations

Intending settlers should obtain from the Department of Immigration and Colonization, Ottawa, and from the steamship and transportation companies the latest regulations regarding customs and freight charges.

A settler may bring into Canada, free of duty, a specified number of live stock which have been owned by him abroad for at least six months before his arrival in Canada. Duty is to be paid on live stock in excess of the specified number. Certain articles for use have free entry, such as wearing apparel, household furniture, tools, vehicles, tractors, agricultural implements etc., if used by the settler for at least six months before his arrival.

Freight regulations specify that farm settlers' effects by carload shipments must consist of household goods and personal effects, live stock not exceeding a total of ten head, lumber and shingles not exceeding 2,500 feet in all, or a portable house, seed grain, trees or shrubbery, poultry and feed. Additional animals will be charged for at special rates. One man will be passed free in charge of full carloads of settlers' effects.

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